MODEL

GD-110 Intercom Master Station

HEATHKIT®

ASSEMBLY MANUAL

HEATH COMPANY • BENTON HARBOR, MICHIGAN

Model GD-110 Intercom Master Station

HEATHKIT

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PRICE $2.00

595-1309-05

Dear Customer:

The Heathkit electronic product you have purchased is one of the best performing electronic products in the world.

Here's how we aim to keep it that way:

Your Heathkit Warranty

During your first 90 days of ownership, any parts which we find are defective, either in materials or workmanship, will be replaced or repaired free of charge. And we'll pay shipping charges to get those parts to you — anywhere in the world.

If we determine a defective part has caused your Heathkit electronic product to need other repair, through no fault of yours, we will service it free — at the factory, at any retail Heathkit Electronic Center, or through any of our authorized overseas distributors.

This protection is exclusively yours as the original purchaser. Naturally, it doesn't cover damage by use of acid-core solder, incorrect assembly, misuse, fire, flood or acts of God. But, it does insure the performance of your Heathkit electronic product anywhere in the world — for most any other reason.

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What happens after warranty? We won't let you down. If your Heathkit electronic product needs repairs or you need a part, just write or call the factory, your nearest retail Heathkit Electronic Center, or any Heath authorized overseas distributor. We maintain an inventory of replacement parts for each Heathkit model at most locations — even for many models that no longer appear in our current product line-up. Repair service and technical consultation are available through all locations.

We hope you'll never need our repair or replacement services, but it's nice to know you're protected anyway — and that cheerful help is nearby.

Sincerely,

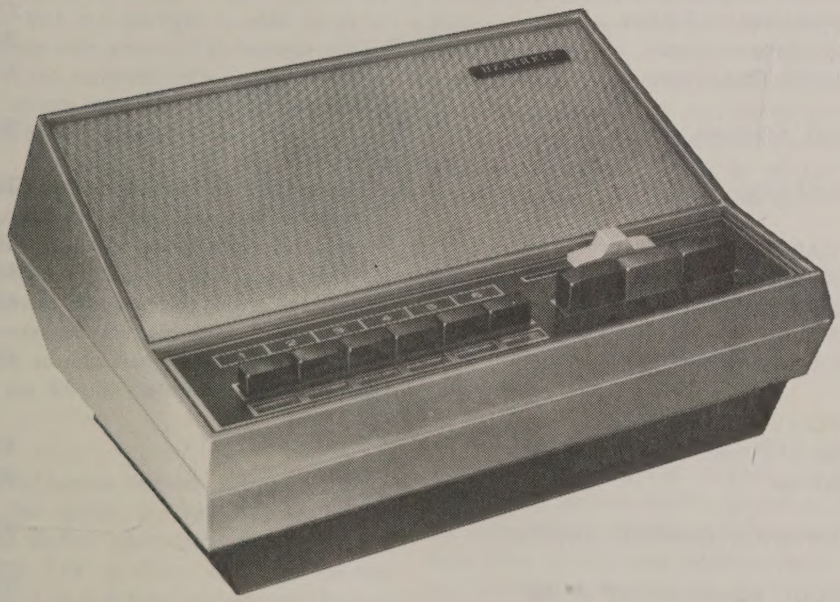
HEATH COMPANY
Benton Harbor, Michigan 49022

Prices and specifications subject to change without notice.

Assembly and Operation of the HEATHKIT®

INTERCOM MASTER STATION

MODEL GD-110



HEATH COMPANY
BENTON HARBOR, MICHIGAN 49022

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INTRODUCTION

The Heathkit Model GD-110 Intercom Master Station is a highly versatile unit that can perform a wide range of functions. It can operate with a total of six remote stations connected to it, or it can form part of a system of master stations, each with remote stations, in which the master stations are connected to each other.

Remote stations can be connected at Station Selector switch positions 1, 2, 3, and 4 for either private or non-private operation. Only private operation is available at positions 5 and 6. For private operation, a Master station can listen only when the remote operator presses down on his Talk switch. With non-private operation, the operator of the Master station can listen to a remote station at any time by just pressing down on the Station Selector switch for that station.

Controls include the six Station Selector switches, a Dictate pushbutton, an All Call switch, the Talk switch, and the Volume control. The Dictate pushbutton holds the Talk switch down in the Talk position until the Dictate pushbutton is pressed a second time and released. The All Call switch allows the Master to talk to all six stations at the same time.

This Intercom Master Station can be used with remote stations and other Master Stations in a wide variety of ways in homes, offices, and factories for: individual calls between stations, conference calls, All Call paging or announcing, and monitoring. Several of these functions can be carried on simultaneously when more than one Master Station is used, and each Master has its own remote stations. Only a very small amount of power is drawn from the ac power line by this unit; therefore, it can be left on to make instant communications available at all times.

The low silhouette cabinet and attractive, mist-green and silver colors will blend with any decor. Your Heathkit Intercom will provide you with an attractive, dependable, communications servant that will serve you faithfully and well in the future.

NOTE: The Heathkit Model GD-120 Indoor Remote Station and the Model GD-130 Outdoor Remote Station were designed for use with this Master station. Refer to Page 6 for the types of wire or cable to use between stations, and for a description of the Heath Intercom Cable that is available to you for this purpose.

Refer to the "Kit Builders Guide" for additional information on unpacking, parts identification, tools, wiring, soldering, and step-by-step procedures.

PARTS LIST

Check each part against the following list. Be sure to open all parts containers and check all parts in containers. The key numbers correspond to the numbers in the Parts Pictorial (fold-out from Page 7).

To order a replacement part, use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Replacement Parts" inside the rear cover of the Manual.

The following prices apply only on purchases from the Heath Company where shipment is to a U.S.A. destination. Add 10% (minimum 25 cents) to the price when ordering from a Heathkit Electronic Center to cover local sales tax, postage and handling. Outside the U.S.A. parts and service are available from your local Heathkit source and will reflect additional transportation, taxes, duties and rates of exchange.

KEY No.	PART No.	PARTS Per Kit	PRICE Each	DESCRIPTION
RESISTORS				
1/2-Watt				
1	1-41	2	.10	10 Ω (brown-black-black)
	1-123	3	.10	100 Ω (brown-black-brown)*
	1-151	2	.10	330 Ω (orange-orange-brown)*
	1-94	1	.10	390 Ω (orange-white-brown)*
	1-79	1	.10	820 Ω (gray-red-brown)*
	1-9	3	.10	1000 Ω (brown-black-red)
	1-144	1	.10	1800 Ω (brown-gray-red)*
	1-89	1	.10	2400 Ω (red-yellow-red)*
	1-122	3	.10	3300 Ω (orange-orange-red)*
	1-105	2	.10	10 kΩ (brown-black-orange)*
	1-109	1	.10	12 kΩ (brown-red-orange)*
	1-133	6	.10	15 kΩ (brown-green-orange)*
	1-50	2	.10	68 kΩ (blue-gray-orange)*
	1-29	1	.10	220 kΩ (red-red-yellow)
	1-99	1	.10	240 kΩ (red-yellow-yellow)*
	1-77	2	.15	390 kΩ (orange-white-yellow)*
2-Watt				
2	3-2-2	2	.25	.33 Ω (orange-orange-silver)
3	1-30-2	1	.25	270 Ω (red-violet-brown)

*5% tolerance
**DuPont Registered Trademark

KEY No.	PART No.	PARTS Per Kit	PRICE Each	DESCRIPTION
CAPACITORS				
Electrolytic				
4	25-54	1	.20	10 μF
	25-56	1	.40	100 μF
	25-131	1	.55	250 μF
	25-199	2	.60	500 μF
Other Capacitors				
5	21-140	3	.10	.001 μF disc
	21-141	1	.10	.0033 μF disc
	21-27	1	.10	.005 μF disc
6	27-74	2	.10	.01 μF (01 K) Mylar**
	27-73	1	.15	.047 μF (047 K) Mylar
	27-47	2	.20	.1 μF (1 K) Mylar
	27-85	3	.20	.22 μF (22 K) Mylar
DIODES-TRANSISTORS				

NOTE: Transistors are marked for identification in one of the following four ways:

1. Part number.
2. Transistor type number.
3. Part number and transistor type number.
4. Part number with a transistor type number other than the one listed.

7	56-61	1	.55	STB620 diode
8	57-65	2	.20	1N4002 diode

KEY No.	PART No.	PARTS Per Kit	PRICE Each	DESCRIPTION
Diodes, Transistors (cont'd.)				
9	417-201	2	.50	X29A829 transistor
	417-91	1	.85	2N5232A/2N3391 transistor
	417-118	1	.40	2N3393 transistor
10	417-153	2	.40	2N4248 transistor
11	417-224	2	1.10	MPSU05
SWITCHES-CONTROL				
12	64-57	1	5.00	3-button switch assembly
13	64-58	1	5.00	6-button switch assembly
14	10-338	1	1.50	50 kΩ control
CHOKE-TRANSFORMER				
15	45-62	1	.40	26 mH choke
16	54-257	1	4.25	Power transformer
HARDWARE				
17	250-420	4	.05	#2 x 1/4" sheet metal screw
18	250-186	2	.05	#4 x 3/8" sheet metal screw
19	250-32	1	.05	6-32 x 3/8" screw
20	250-249	4	.10	6-32 x 5/8" square head screw
21	250-170	6	.05	#6 x 1/4" sheet metal screw
22	250-284	5	.05	#6 x 1/2" sheet metal screw
23	250-347	6	.05	#6 x 1" sheet metal screw
24	253-60	2	.05	#6 flat washer
25	254-6	4	.05	#6 lockwasher
26	252-3	5	.05	6-32 nut
PLASTIC PARTS				
27	75-71	1	.10	Strain relief
28	207-19	2	.10	Plastic cable clamp
29	75-138	4	.10	Plastic foot
30	462-331	1	.15	Control knob
31	92-56	1	.60	Cabinet top
32	92-57	1	1.30	Cabinet bottom
33	214-126	1	.65	Terminal board cover
METAL PARTS				
34	432-134	8	.10	Wire socket
35	209-64	1	1.05	Grille
36	203-768	1	.50	Escutcheon
37	214-127	1	.25	Terminal mounting box

KEY No.	PART No.	PARTS Per Kit	PRICE Each	DESCRIPTION
WIRE				
	344-33	1	.05/ft	Hookup wire
	347-36	1	.45/ft	15-wire cable
	89-1	1	.65	Line cord
MISCELLANEOUS				
	75-103	1	.10	Insulating paper
	73-92	1	.15	Double-sided foam adhesive tape
38	431-43	1	.10	3-lug terminal strip
	85-471-2	1	1.00	Amplifier circuit board
	85-463-1	1	1.00	Switch circuit board
	401-146	1	3.70	Speaker
39	431-88	1	1.50	Terminal board
	390-345	1	.20	Wiring identification label
	390-349	1	.15	Name identification label
	446-91	1	.15	Name identification window
	390-341	1	.10	Heathkit label
	391-34	1		Blue and white label
	597-308	1		Kit Builders Guide
	597-260	1		Parts Order Form
		1	2.00	Manual (See front cover for part number.)
				Solder (Additional 3' rolls of solder, #331-6, can be ordered for 15 cents each.)

FOR CONNECTIONS BETWEEN STATIONS, USE:

- Two wires between a Master and a Model GD-130 Outdoor Remote Station.
- Three wires between two Master Stations (three wires of a 4-wire cable can be used).
- Four wires between a Master and a Model GD-120 Indoor Remote Station.

NOTE: Recommended 2-or 4-wire twisted intercom cable can be ordered from the Heath Company (see below). Cable can also be obtained from your local electronic supply store (use cable with the wires twisted at least one turn per inch to minimize interference from sources outside the intercom system). Be sure to determine your interstation wire needs carefully before ordering. Refer to the "Installation" section of this Manual, Page 25.

The following Intercom cable can be ordered from Heath Company:

Intercom Wire Pack Model GDA-110-2, 100 feet of 4-wire cable.

Intercom Wire Pack Model GDA-110-4, 100 feet of 2-wire cable.

STEP-BY-STEP ASSEMBLY

Before you start the "Circuit Board Assembly," be sure to read the "Circuit Board Parts Mounting" and "Soldering" sections of the "Kit Builders Guide."

CIRCUIT BOARD ASSEMBLY

Components will be installed on the circuit board in the steps on Pages 8 through 10. Position all parts as shown in Pictorials 1 through 13. Follow the instructions carefully and read the entire step before performing each operation.

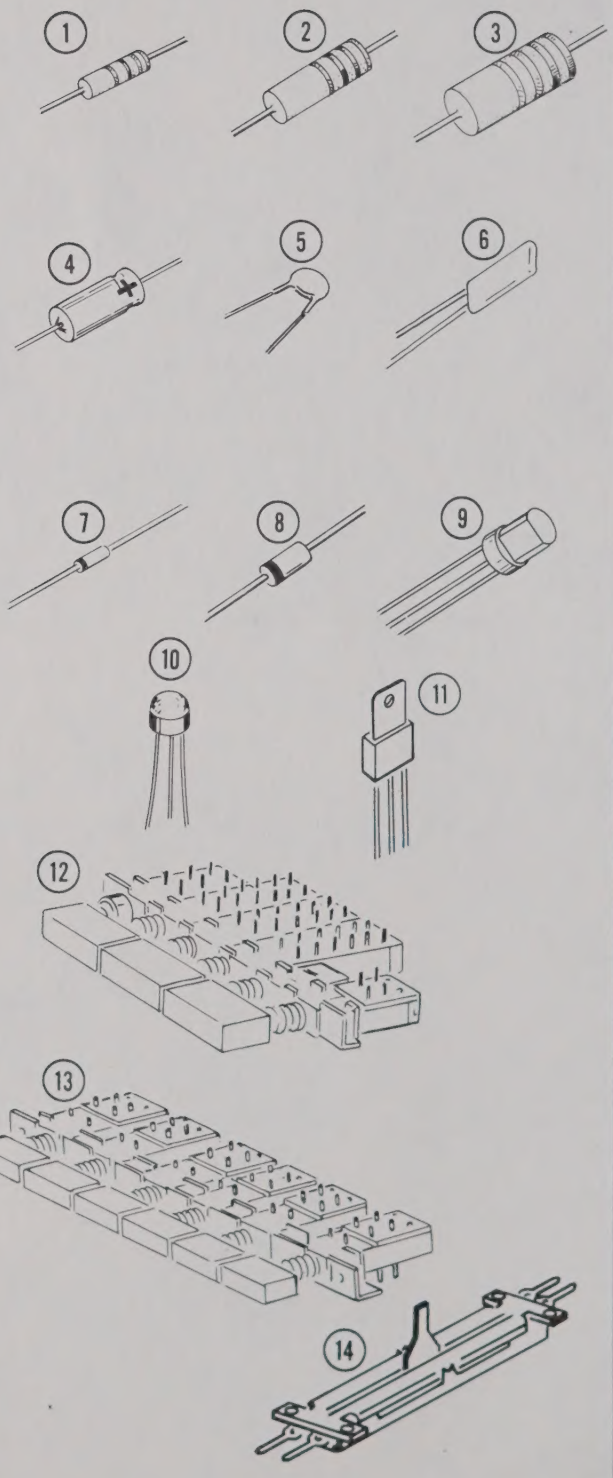
All resistors will be called out by resistance values (in Ω or kΩ); the color code will also be given for all resistors.

Capacitors will be called out by capacitance value (in μF) and type (electrolytic, disc, or Mylar).

Locate the circuit board and position it lettered side up as shown in Pictorial 1. Then complete each step on Pictorial 1.

NOTE: All resistors which are installed on the circuit board are 1/2-watt unless otherwise specified in a step.

PARTS PI



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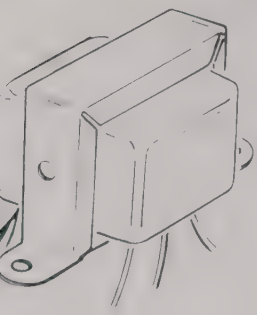

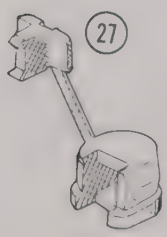

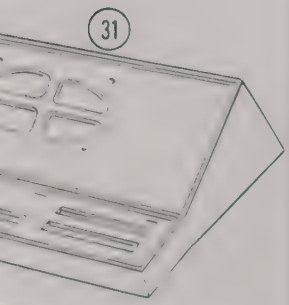

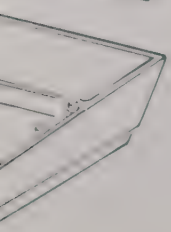

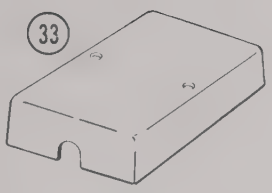

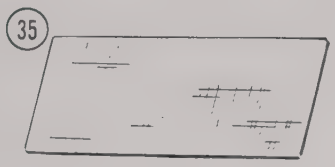

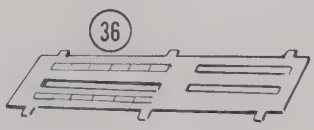

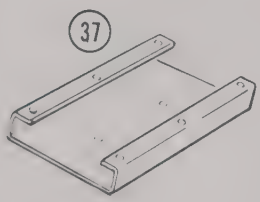

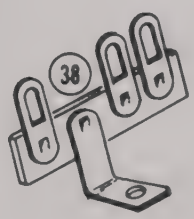

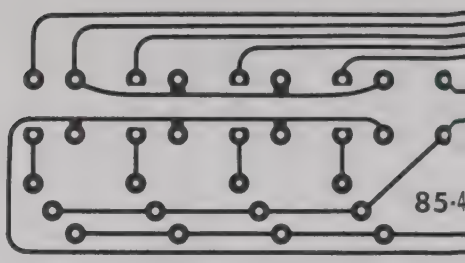

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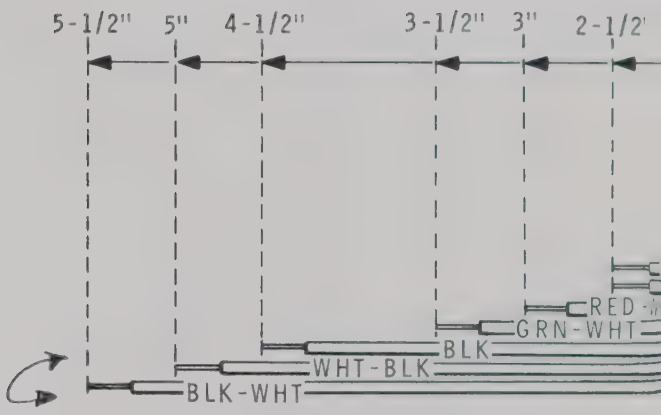
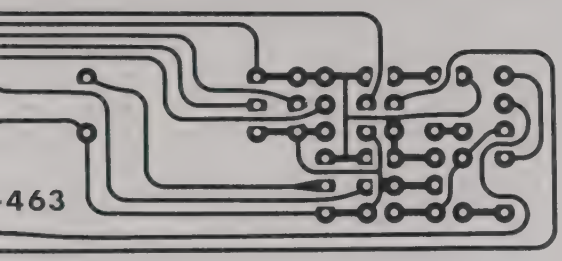


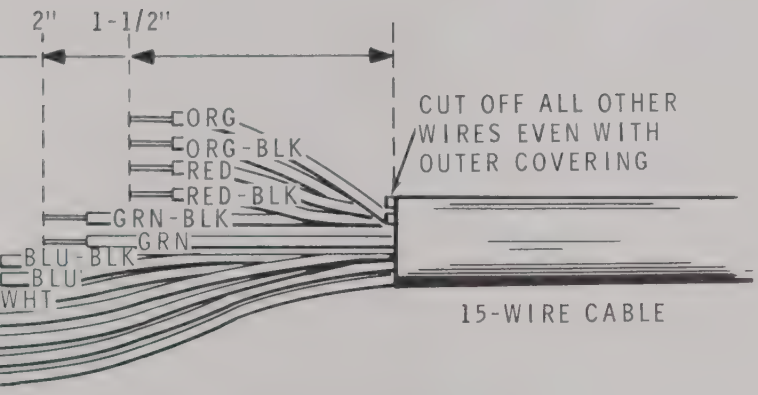
PREPARE ONE END OF THE 15-

1. REMOVE 5-1/2" OF OUTER I NOT TO CUT THE INSULATIO
2. IF THERE ARE ANY PLASTIC CUT THEM OFF. THESE STRA WIRES, BUT HAVE NO WIRE
3. CUT EACH WIRE TO THE LEN 3/16" OF INSULATION FROM
4. TWIST TOGETHER THE SMAL EACH WIRE AND APPLY A S TO HOLD THE SEPARATE STR

Deta



tail 5A



5-WIRE CABLE AS FOLLOWS:

INSULATION. BE CAREFUL
ION ON THE WIRES.

IC FILLER STRANDS,
ANDS LOOK LIKE INSULATED
E IN THE CENTER.

ENGTH SHOWN AND REMOVE
OM EACH WIRE END.

ALL STRANDS AT THE END OF
SMALL AMOUNT OF SOLDER
TRANDS TOGETHER.

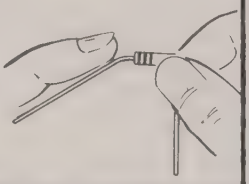
tail 6A

START

Position the amplifier circuit board (#85-471) as shown.

FOR GOOD SOLDERED CONNECTIONS, YOU MUST KEEP THE SOLDERING IRON TIP CLEAN... WIPE IT OFTEN WITH A DAMP SPONGE OR CLOTH

NOTE: To install resistors and diodes, hold them as shown and bend the leads straight down.



( ) 1000 Ω (brown-black-red).

( ) 390 Ω (orange-white-brown).

( ) 820 Ω (gray-red-brown).

( ) 1800 Ω (brown-gray-red).

( ) 2400 Ω (red-yellow-red).

( ) 1000 Ω (brown-black-red).

( ) Solder all connections and cut off the excess lead lengths.

( ) 220 kΩ (red-red-yellow).

( ) 10 Ω (brown-black-black).

( ) 390 kΩ (orange white-yellow).

( ) 68 kΩ (blue-gray-orange).

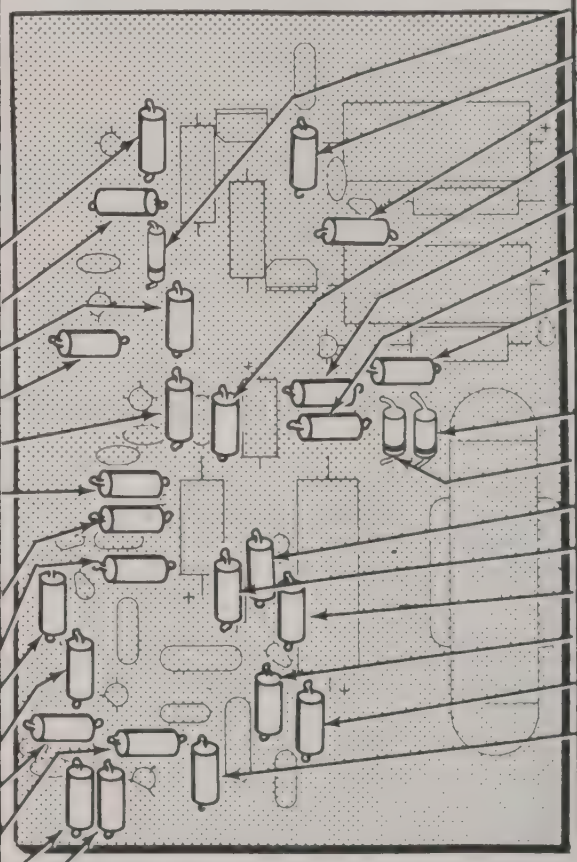
( ) 12 kΩ (brown-red-orange).

( ) 68 kΩ (blue-gray-orange).

( ) 10 kΩ (brown-black-orange).

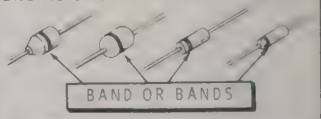
( ) 10 kΩ (brown-black-orange).

( ) Solder all connections and cut off the excess lead lengths.



CONTINUE

NOTE: DIODES MAY BE SUPPLIED IN ANY OF THE FOLLOWING SHAPES. THE CATHODE END OF THE DIODE IS MARKED WITH A BAND OR BANDS. ALWAYS POSITION THIS END AS SHOWN IN THE PICTORIAL.



( ) STB620 diode (#56-61).

( ) 10 Ω (brown-black-black).

( ) 1000 Ω (brown-black-red).

( ) 240 kΩ (red-yellow-yellow).

( ) 3300 Ω (orange-orange-red).

( ) 3300 Ω (orange-orange-red).

( ) 3300 Ω (orange-orange-red).

( ) Solder all connections and cut off the excess lead lengths.

( ) 1N4002 diode (#57-65).

( ) 1N4002 diode (#57-65).

( ) 100 Ω (brown-black-brown).

( ) 330 Ω (orange-orange-brown).

( ) 100 Ω (brown-black-brown).

( ) 330 Ω (orange-orange-brown).

( ) 100 Ω (brown-black-brown).

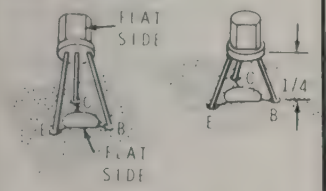
( ) 390 kΩ (orange-white-yellow).

( ) Solder all connections and cut off the excess lead lengths.

PICTORIAL 1

START

NOTE: When installing the following transistors, position the E, C, and B leads of each transistor into the E, C, and B holes of the circuit board. Position the body of the transistor over its outline and 1/4" above the circuit board. Solder all three connections and cut off the excess lead lengths as each transistor is installed.



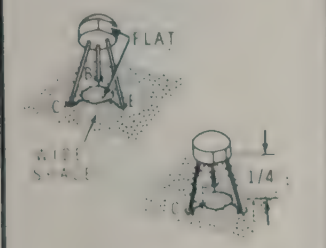
( ) 2N3393 transistor (#417-118) at Q5.

( ) X29A829 transistor (#417-201) at Q7.

( ) X29A829 transistor (#417-201) at Q4.

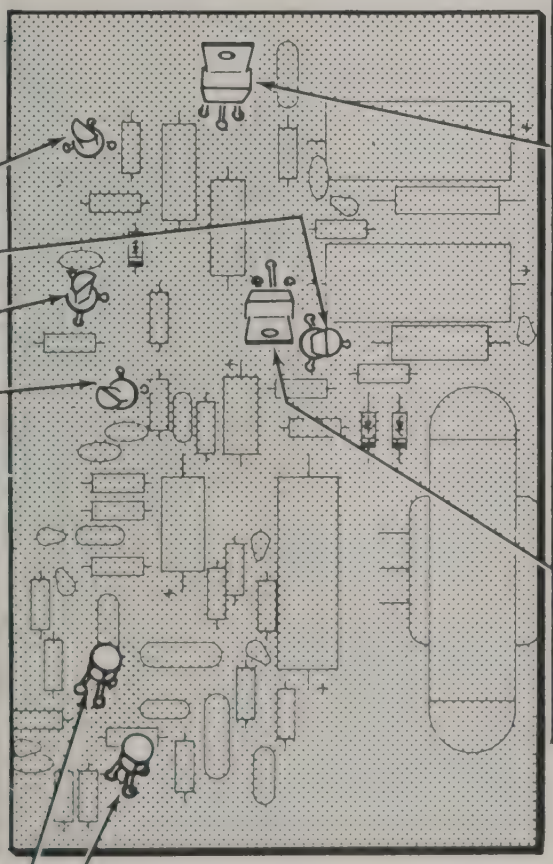
( ) 2N5232A/2N3391 transistor (#417-91) at Q3

NOTE: When installing the following transistors, position the E, B, and C leads of each transistor into the E, B, and C holes of the circuit board. Position the body of the transistor over its outline and 1/4" above the circuit board. Solder all three connections and cut off the excess lead lengths as each transistor is installed.



( ) 2N4248 transistor (#417-153) at Q2.

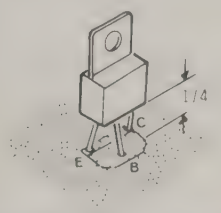
( ) 2N4248 transistor (#417-153) at Q1.



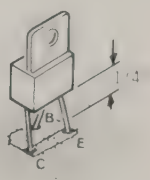
PICTORIAL 2

CONTINUE

( ) MPSU05 transistor (#417-224) at Q6. Place the E, B, and C leads into the E, B, and C holes of the circuit board, solder the leads to the foil, and cut off the excess lead lengths.



( ) MPSU05 transistor (#417-224) at Q8.



START

NOTE: When installing disc capacitors, remove any ceramic insulation from the leads before installing the capacitors. Also, the leads of the Mylar capacitors may be coated with a clear film. Therefore, if you encounter any soldering problem with Mylar capacitors, scrape the leads with a knife blade or long-nose pliers to remove this film.

( ) .001 μF disc.

( ) 10 μF electrolytic. Position the positive (+) end as shown.

( ) .01 μF Mylar.

( ) .001 μF disc.

( ) .0033 μF disc.

( ) .01 μF Mylar.

( ) Solder all connections and cut off the excess lead lengths.

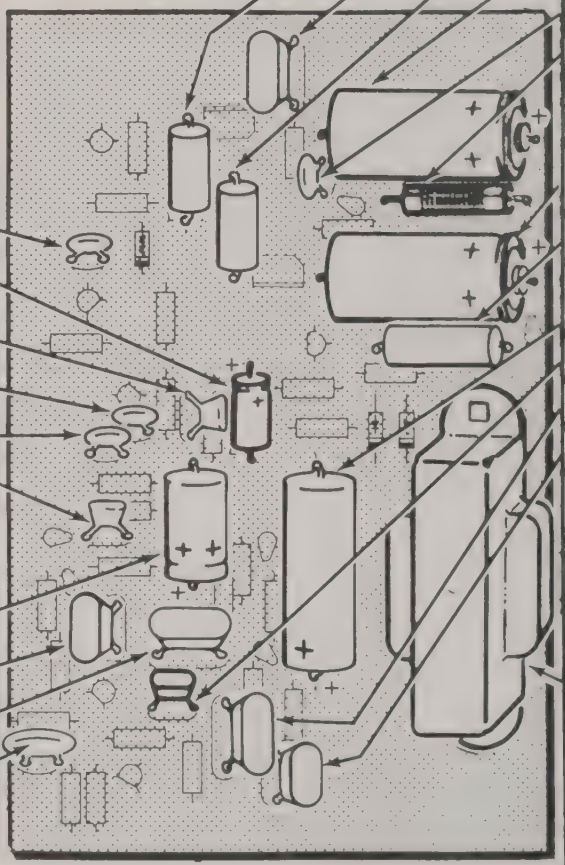
( ) 100 μF electrolytic. Position the positive (+) end as shown.

( ) .1 μF Mylar.

( ) .22 μF Mylar.

( ) .005 μF disc.

( ) Solder all connections and cut off the excess lead lengths.



CONTINUE

( ) .33 Ω, 2-watt (orange-orange-silver).

( ) .22 μF Mylar.

( ) .33 Ω, 2-watt (orange-orange-silver).

( ) 500 μF electrolytic. Position the positive (+) lead as shown.

( ) .001 μF disc.

( ) 26 mH choke (#45-62).

( ) Solder all connections and cut off the excess lead lengths.

( ) 500 μF electrolytic. Position the positive (+) lead as shown.

( ) 270 Ω, 2-watt (red-violet-brown).

( ) 250 μF electrolytic. Position the positive (+) lead as shown.

( ) .047 μF Mylar.

( ) .22 μF Mylar.

( ) .1 μF Mylar.

( ) Solder all connections and cut off the excess lead lengths.

( ) Position the three bare leads of the power transformer into the indicated holes of the circuit board. Mount the transformer to the circuit board with 6-32 x 5/8" square head screws and 6-32 nuts. Tighten the hardware only finger tight. Solder all three leads to the foil and cut off their excess lengths.

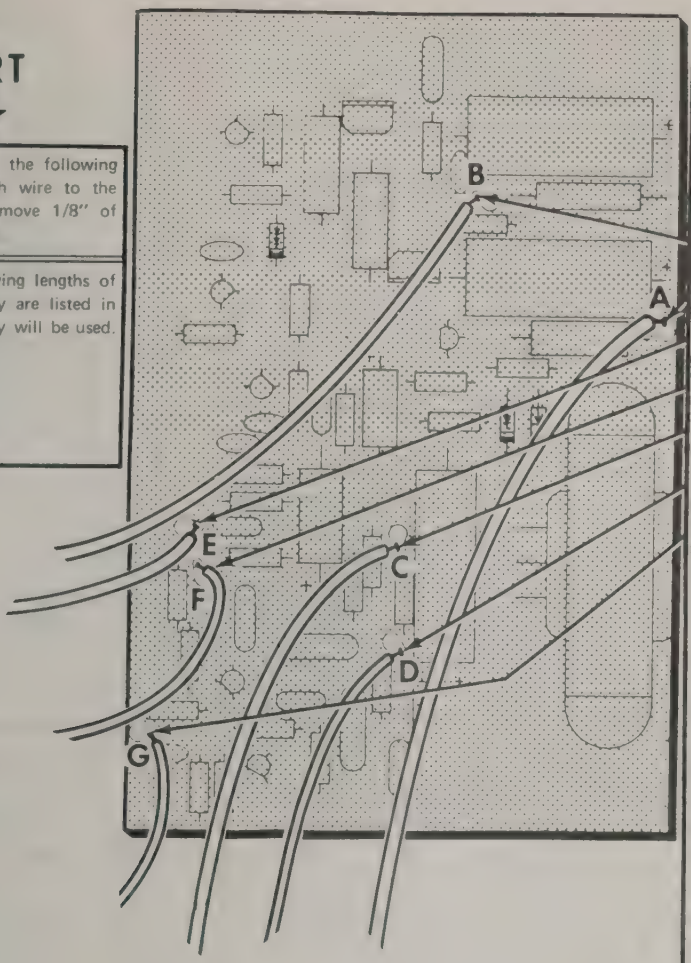
PICTORIAL 3

START

NOTE: When preparing the following hookup wires, cut each wire to the specified length and remove 1/8" of insulation from each end.

( ) Prepare the following lengths of hookup wire. They are listed in the order that they will be used.

5-1/2"	4"
5-1/2"	4"
9"	5"
9-1/2"	



PICTORIAL 4

CONTINUE

In the following steps install one end of each wire into the indicated hole in the circuit board. Solder each wire as it is installed and cut off any excess. The free end of each wire will be connected later.

( ) 5-1/2" wire at B.

( ) 5-1/2" wire at A.

( ) 9" wire at E.

( ) 9-1/2" wire at F.

( ) 4" wire at C.

( ) 4" wire at D.

( ) 5" wire at G.

CIRCUIT BOARD CHECKOUT

It is important that the following check-out procedure be done after this circuit board is completed.

Visual Inspection

Carefully inspect the foil side of the circuit board for the following most commonly made errors. Your "Kit Builders Guide" should be consulted for remedying these problems, if any exist.

( ) Unsoldered connections.

( ) "Cold" solder connections.

( ) Solder bridges between foil patterns.

( ) Protruding leads which could touch together.

When making the following visual checks, refer to the Pictorial where the part was installed and check it against the installation instructions.

( ) Check transistors for the proper type and installation.

( ) Check electrolytic capacitors for the correct position of the positive (+) end.

( ) Check each diode for the correct position of the banded end.

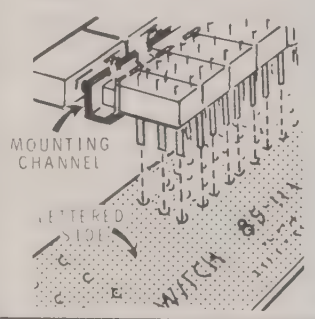
Set the amplifier circuit board aside temporarily.

FINISH

START

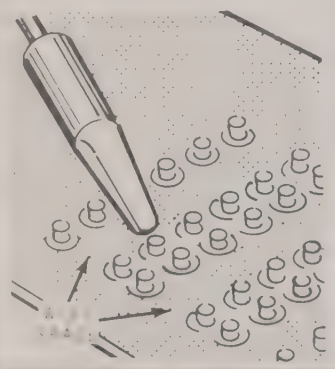
Position the switch circuit board with the lettered side up and the "Private" and "Non-private" buses as shown.

( ) With the mounting channel of the 6-button switch assembly facing toward the switch circuit board, align the switch pins with the matching holes in the circuit board. Then carefully press the switch assembly in place. Be sure that all pins are through the circuit board and that the mounting channel is completely flat against the circuit board.

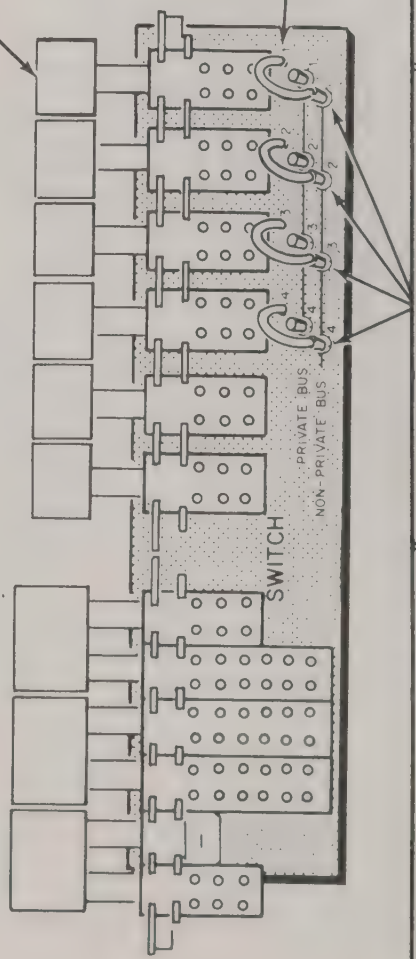


( ) Turn the circuit board over and solder all pins which go through a foil. Do not cut off the excess pin lengths.

NOTE: In the next step, apply the solder and soldering iron from the wide space side of each switch pin to avoid solder bridges on the circuit board.



( ) In the same manner, mount the 3-button switch assembly on the circuit board. Solder all pins that go through foils.



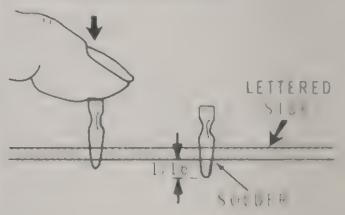
PICTORIAL 5

CONTINUE

( ) Prepare four 1-1/2" lengths of hookup wire by removing 1/4" of insulation from each end of each wire.

( ) Solder one end of each wire in one of the four indicated holes of the circuit board. The other end of each wire will remain free for the time being. Cut off any excess wire lengths on the foil side of the circuit board.

( ) Install wire sockets (#432-134) in the eight holes as shown (four along the "Private" bus line and four along the "Non-Private" bus line). Solder each wire socket to the foil.



( ) Push the free end of each of the four jumper wires into its wire socket in the "Non-Private" bus line. Do not solder these connections.

Visual Inspection

Carefully inspect the foil side of the circuit board for the following most commonly made errors. Your "Kit Builders Guide" should be consulted for remedying these problems, if any exist.

( ) Unsoldered connections.

( ) "Cold" solder connections.

( ) Solder bridges between foil patterns. See Detail 5A (fold-out from Page 8). Especially check for solder bridges between switch pins not joined by a circuit board foil.

( ) Protruding leads which could touch each other.

Set the switch circuit board aside temporarily.

START

NOTE In the following steps the wire colors are given with the background color listed first and the stripe color last.

( ) Locate the 15-wire cable and prepare one end of it as shown in Detail 6A (fold-out from Page 8).

( ) Using a hobby knife, cut through the breakout for the 15-wire cable in the rear of the cabinet.

( ) Pass the prepared end of the 15-wire cable through the indicated hole in the cabinet bottom and place it near the switch circuit board as shown.

The wires from the cable will be connected to the switches in the following steps. Solder each wire as it is connected. See the inset drawing. Make sure its bare end does not touch any other switch pin.

( ) Red-black to AA2.

( ) Red to AA5.

( ) Orange-black to AB2.

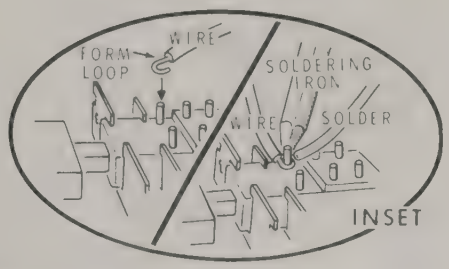
( ) Orange to AB5.

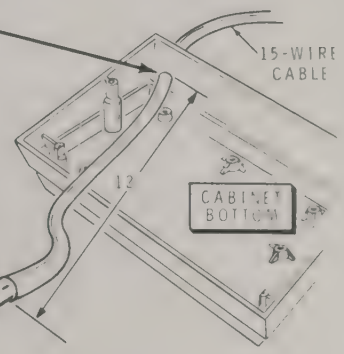
( ) Green-black to AC2.

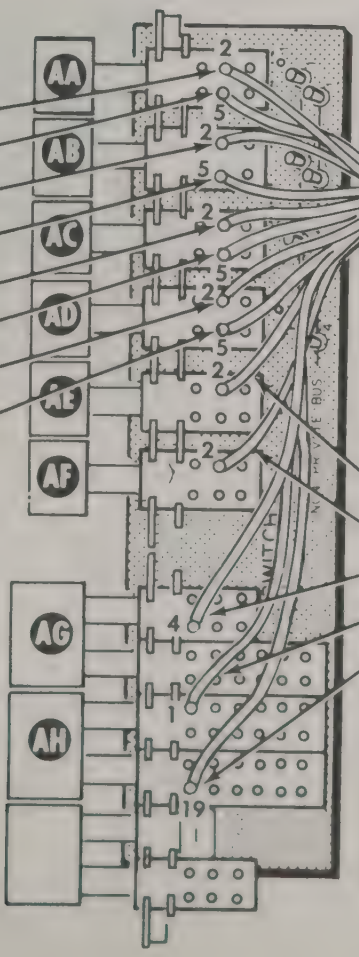
( ) Green to AC5.

( ) Blue-black to AD2.

( ) Blue to AD5.







CONTINUE

( ) Red-white to AE2.

( ) Green-white to AF2.

( ) Black to AG4

( ) White-black to AH1.

( ) Black-white to AH19

PICTORIAL 6

START

( ) Position the amplifier circuit board next to the switch circuit board as shown.

In the following steps the wires from the amplifier circuit board will be connected to the switches. Solder each wire as it is connected, making sure its bare end does not touch any other switch pin.

( ) Wire from hole A to switch pin AG7.

( ) Wire from hole B to switch pin AH21.

( ) Wire from hole C to switch pin AH23.

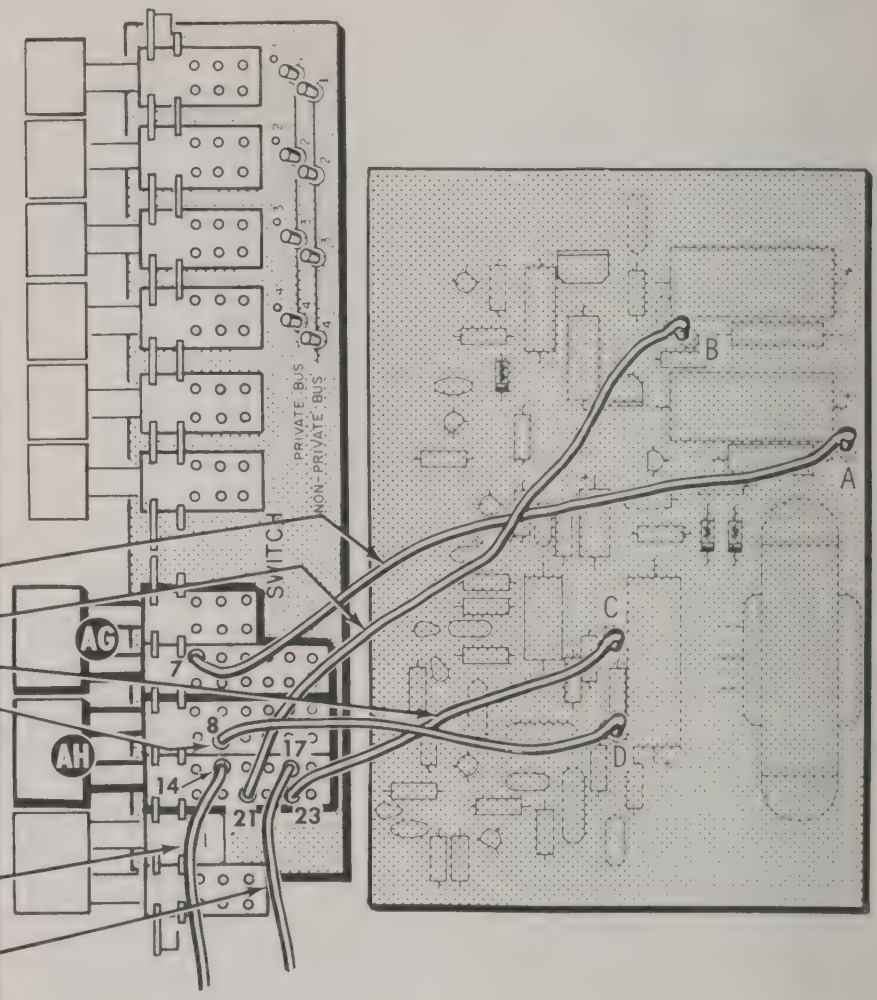
( ) Wire from hole D to switch pin AH8.

( ) Prepare two 9" hookup wires by removing 1/4" of insulation from one end and 3/16" of insulation from the other end of each wire.

( ) Solder the 3/16" stripped end of a 9" wire to switch pin AH14.

( ) Solder the 3/16" stripped end of the other 9" wire to switch pin AH17.

The free ends of the five remaining wires will be connected later.



PICTORIAL 7

START

( ) Remove the screws and nuts that are holding the power transformer on the amplifier circuit board. Position the transformer leads under the transformer bell and route them toward point Y as shown.

( ) Carefully position the amplifier and switch circuit boards into the cabinet bottom. Allow 4-1/2" of the 15-wire cable to remain inside the cabinet, as shown.

( ) Align the holes in the amplifier and switch circuit boards with the holes in the mounting bosses in the cabinet bottom.

NOTE: When you install the sheet metal screws in the following steps, do not tighten any of the screws all the way until you are directed to do so in a separate step.

( ) Install #6 x 1/4" sheet metal screws at holes S and T of the circuit board.

( ) Install a #6 x 1/2" sheet metal screw at mounting hole X of the power transformer.

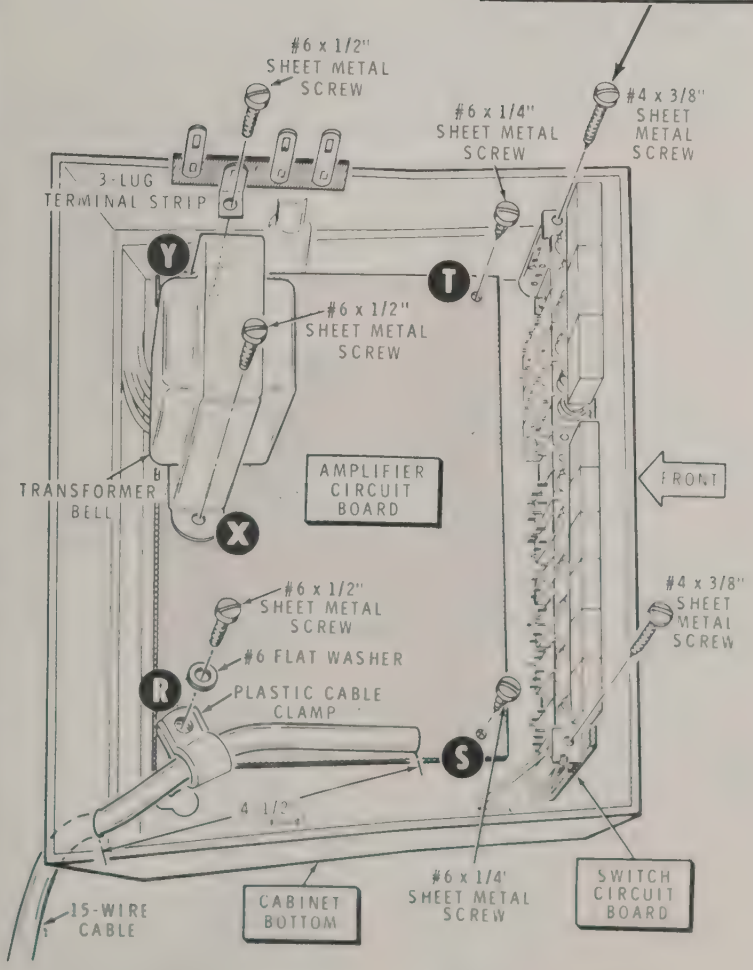
( ) Install a 3-lug terminal strip with a #6 x 1/2" sheet metal screw at hole Y of the power transformer. Position the terminal strip parallel to the side of the cabinet.

( ) Place a plastic cable clamp over the 15-wire cable. Then install it to the cabinet bottom with a #6 flat washer and a #6 x 1/2" sheet metal screw at hole R of the amplifier circuit board.

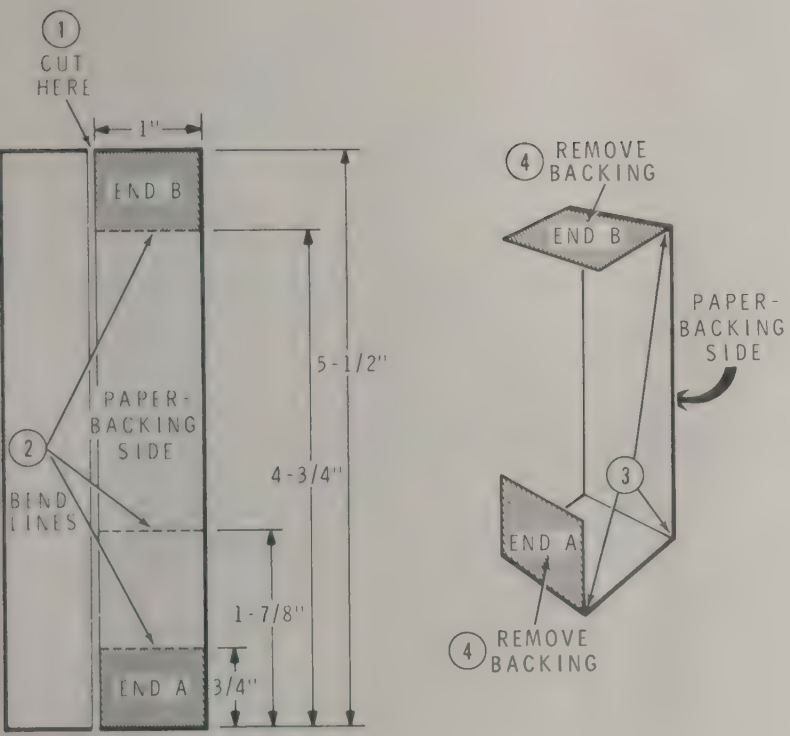
CONTINUE

( ) Now tighten the five screws that hold the amplifier circuit board in place. CAUTION: Do not overtighten the screws or you could strip the threads in the plastic mounting bosses.

( ) Secure the switch circuit board to the long bosses in the cabinet bottom with two #4 x 3/8" sheet metal screws. CAUTION: Do not overtighten the screws.



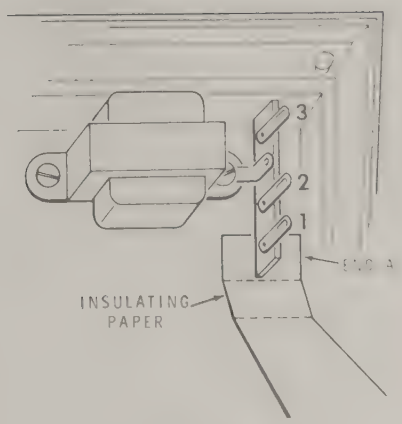
PICTORIAL 8



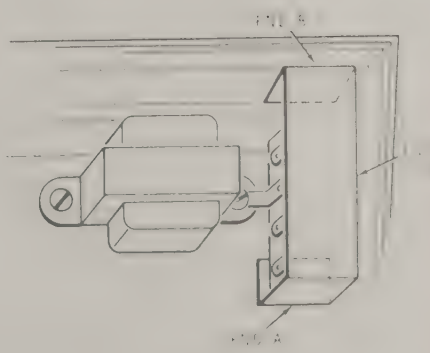
PREPARE THE INSULATING PAPER AS FOLLOWS:

1. CUT A 1" x 5-1/2" LENGTH OF INSULATING PAPER.
2. MARK BEND LINES ON THE PAPER BACKING AS SHOWN.
3. BEND THE INSULATING PAPER AT EACH BEND LINE.
4. REMOVE PAPER BACKING ONLY FROM END A AND END B.

Detail 9B



Detail 9C



Detail 9D

START

( ) Locate the line cord and separate the two wires for a length of 2-1/2".

( ) Position the strain relief 3" from the end of the line cord. Then install the strain relief as shown in Detail 9A in the indicated hole of the cabinet bottom.

ALTERNATE LINE VOLTAGE WIRING

Two sets of wiring instructions follow, one for 120 Vac line voltage and the other for 240 Vac line voltage. In the U.S.A. 120 Vac is most often used, while in many other countries 240 Vac is most common. USE ONLY THE INSTRUCTIONS THAT AGREE WITH THE LINE VOLTAGE IN YOUR AREA.

120 Vac Wiring

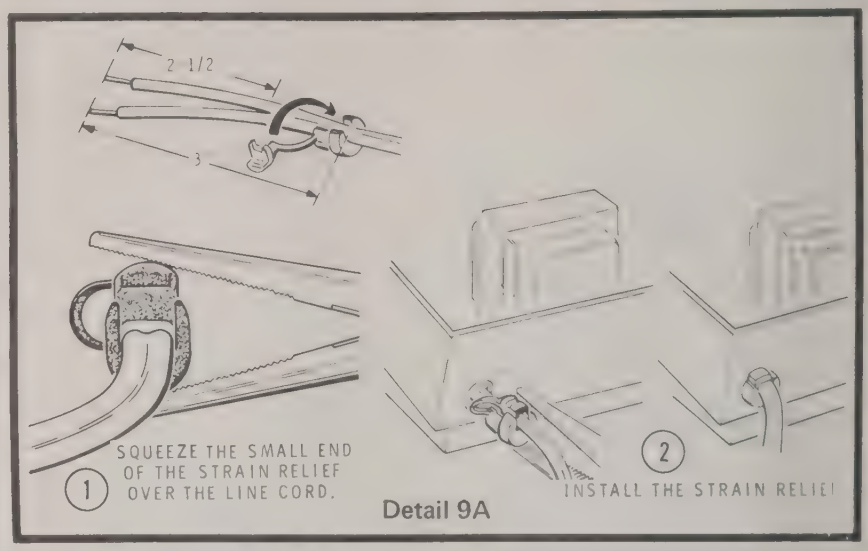
( ) Connect the yellow-black and red-black transformer leads to lug 3 of the terminal strip (NS).

( ) Connect either line cord lead to lug 3 of the terminal strip (S-3).

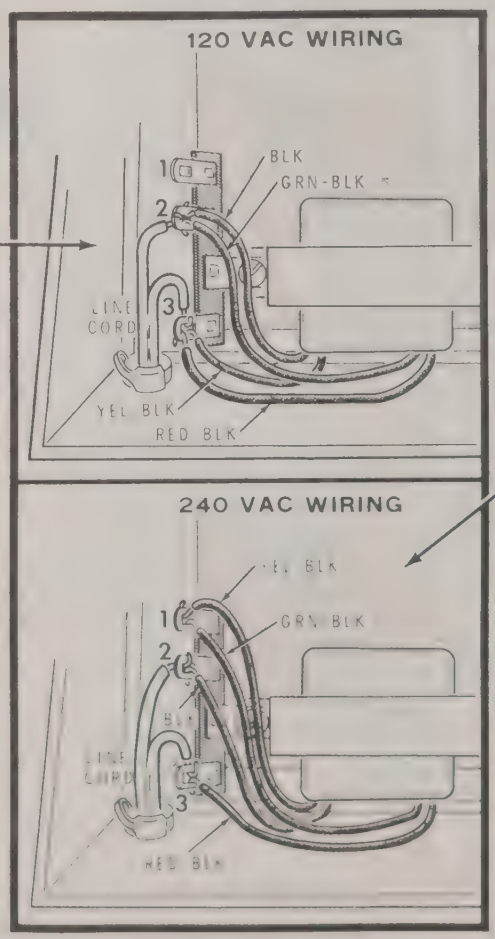
( ) Connect the black and green-black transformer leads to lug 2 of the terminal strip (NS).

( ) Connect the other line cord lead to lug 2 of the terminal strip (S-3).

Proceed to the "AC Shielding" steps in the next column.



Detail 9A



PICTORIAL 9

CONTINUE

240 Vac Wiring

( ) Connect the red-black transformer lead to lug 3 of the terminal strip (NS).

( ) Connect either line cord lead to lug 3 of the terminal strip (S-2).

( ) Connect the black transformer lead and the other line cord lead to lug 2 of the terminal strip (S-2).

( ) Connect the yellow-black and green-black transformer leads to lug 1 of the terminal strip (S-2).

Proceed to the "AC Shielding" steps below.

AC SHIELDING

( ) Refer to Detail 9B on the fold-out from this page and prepare the insulating paper as shown.

( ) Refer to Detail 9C and remove the backing paper from end A of the insulating paper. Then position end A under lug 1 of the terminal strip in the position shown, and stick it to the circuit board.

( ) Refer to Detail 9D and remove the backing paper from end B. Then stick end B to the cabinet back as shown.

START

FINAL WIRING

( ) Position the terminal board as shown.

NOTE: When mounting the resistors to the terminal board in the following steps, position the resistors down between the lugs as shown, and make sure the resistor leads touch only the lugs to which they are connected.

NOTE: Where a wire passes through a lug and then goes to another lug, as in the next step, it will count as two wires in the solder instructions (S-2), one entering and one leaving the connection.

( ) 15 kΩ (brown-green-orange) from lug 1 (S-1) through lug 8 (NS) to lug 7 (NS).

( ) 15 kΩ (brown-green-orange) from lug 2 (S-1) to lug 7 (NS).

( ) 15 kΩ (brown-green-orange) between lugs 3 (S-1) and 8 (S-3).

( ) 15 kΩ (brown-green-orange) from lug 4 (S-1) through lug 9 (NS) to lug 10 (NS).

( ) 15 kΩ (brown-green-orange) from lug 5 (S-1) to lug 9 (NS).

( ) 15 kΩ (brown-green-orange) between lugs 6 (S-1) and lug 10 (S-2).

Prepare the free end of the 15-wire cable coming from the cabinet by performing the following steps.

( ) Remove 3" of the outer covering. Be careful not to cut the insulation of the wires.

( ) Cut the following wires to a length of 2":

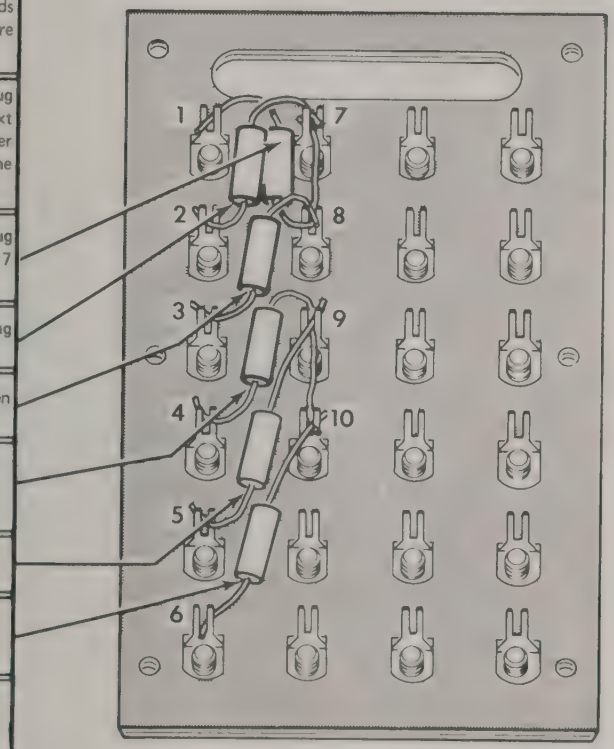
Black	Green
Red-white	Blue
Green-white	Green-black
White-black	Blue-black

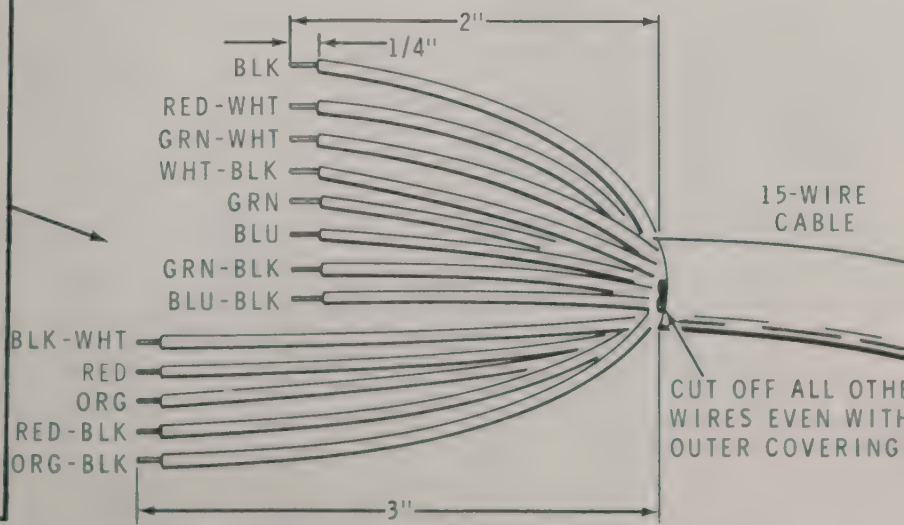
( ) Cut off and discard the white and blue-white wires and any plastic filler strands. These strands look like insulated wires, but have no wire in the center.

( ) Remove 1/4" of insulation from the end of each wire.

( ) Twist together the small strands and apply a small amount of solder to each wire end.

FINISH





PICTORIAL 10

START

The wires from the free end of the 15-wire cable will be connected to the terminal board in the following steps. Position the terminal board as shown.

( ) Remove all the insulation from a 2" hookup wire. Connect this wire from lug 12 (S-1), through lugs 11 (S-2) and 17 (S-2), to lug 18 (NS).

( ) Green-white to lug 24 (S-1).

( ) Black to lug 18 (S-2).

( ) Red-white to lug 23 (S-1).

( ) Blue-black to lug 22 (S-1).

( ) Blue to lug 16 (S-1).

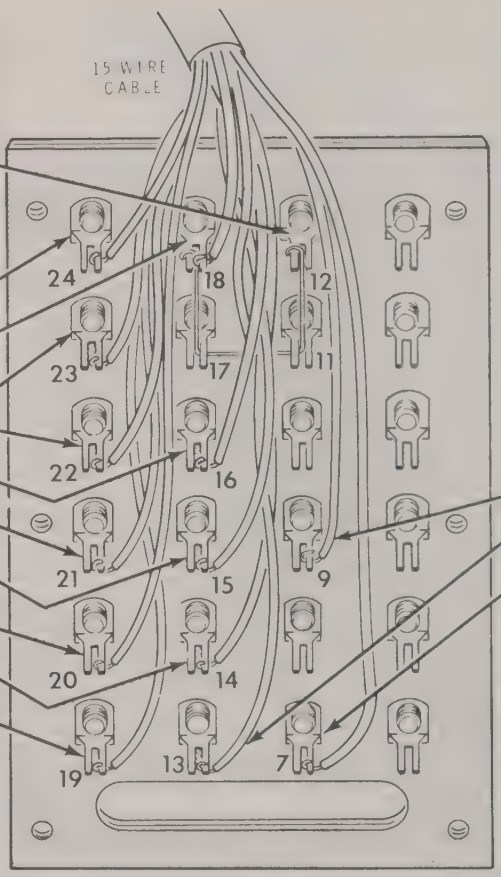
( ) Green-black to lug 21 (S-1).

( ) Green to lug 15 (S-1).

( ) Orange-black to lug 20 (S-1).

( ) Orange to lug 14 (S-1).

( ) Red-black to lug 19 (S-1).



CONTINUE

( ) White-black to lug 9 (S-4).

( ) Red to lug 13 (S-1).

( ) Black-white to lug 7 (S-3).

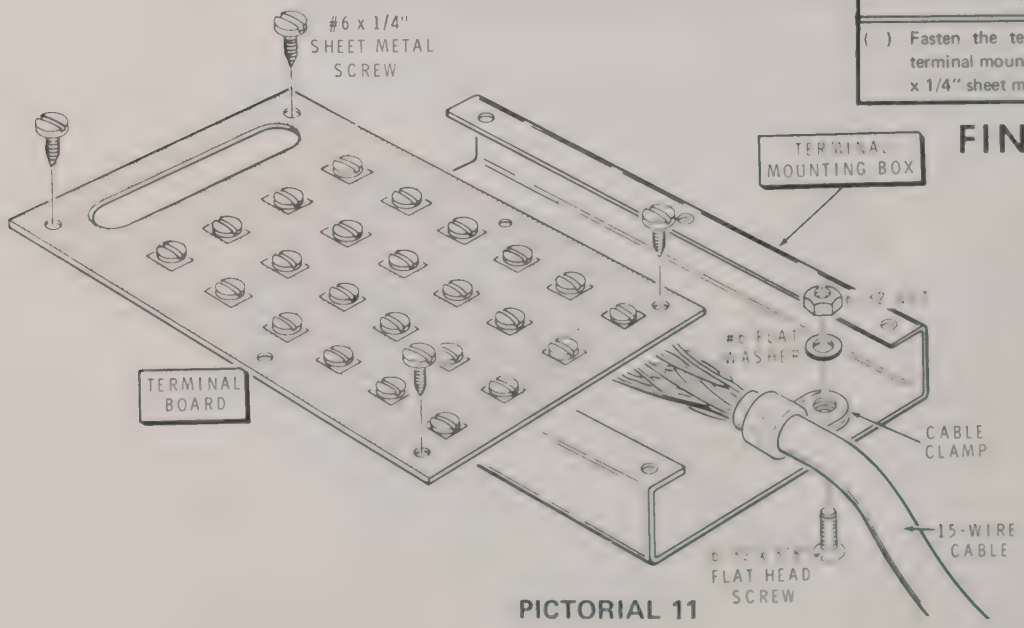
Check to see that all connections are soldered.

Position the terminal mounting box as shown.

( ) Place a cable clamp, as shown, over the 15-wire cable. Secure the cable clamp to the terminal mounting box with a 6-32 x 3/8" flat head screw, a #6 flat washer, and a 6-32 nut.

( ) Fasten the terminal board to the terminal mounting box with four #6 x 1/4" sheet metal screws.

FINISH



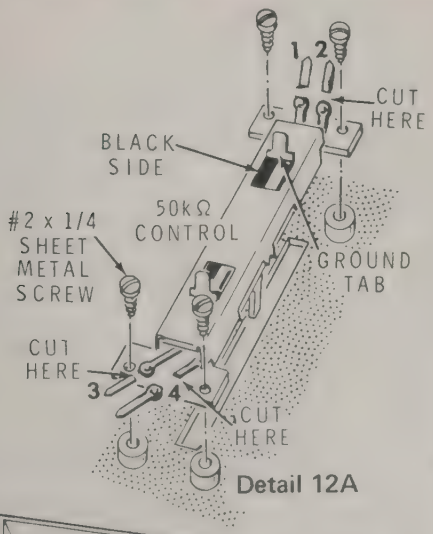
PICTORIAL 11

START

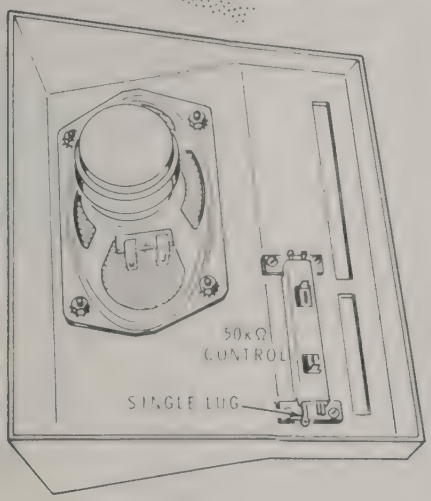
( ) Position the cabinet top upside down as shown.

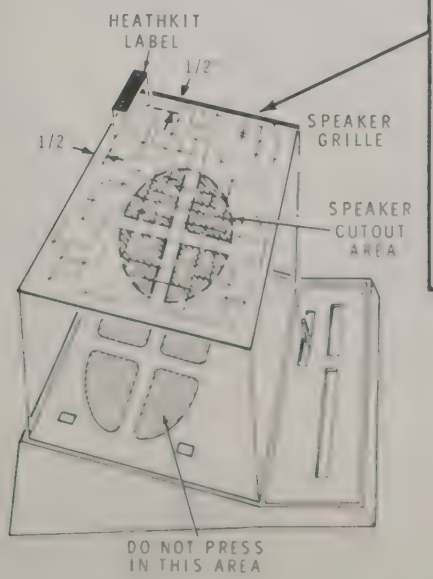
CAUTION: Handle the speaker carefully in the next steps so that you do not puncture the paper cone.

( ) Mount the speaker to the cabinet top with 6-32 x 5/8" square head screws, #6 lockwashers and 6-32 nuts. Position the speaker as shown. Be sure the square head of each screw fits into the recess in the cabinet top. Bend the speaker lugs down at a 45 degree angle toward the speaker cone as shown.



Detail 12A





PICTORIAL 12

CONTINUE

Refer to Detail 12A for the following steps.

( ) Scrape the paint off the ground tab on the control so it is shiny on both sides. Shake the control to remove any scrapings which may have fallen inside the control.

( ) Look through the openings in the back of the 50 kΩ control and note the side of the control that has the black resistance element.

( ) Position the control in front of you with the black side as shown. Then mark lugs 1, 2, 3, and 4 on the control.

( ) Bend lugs 1, 2, and 3 up as shown. Then cut them off just above the eyelet, as shown.

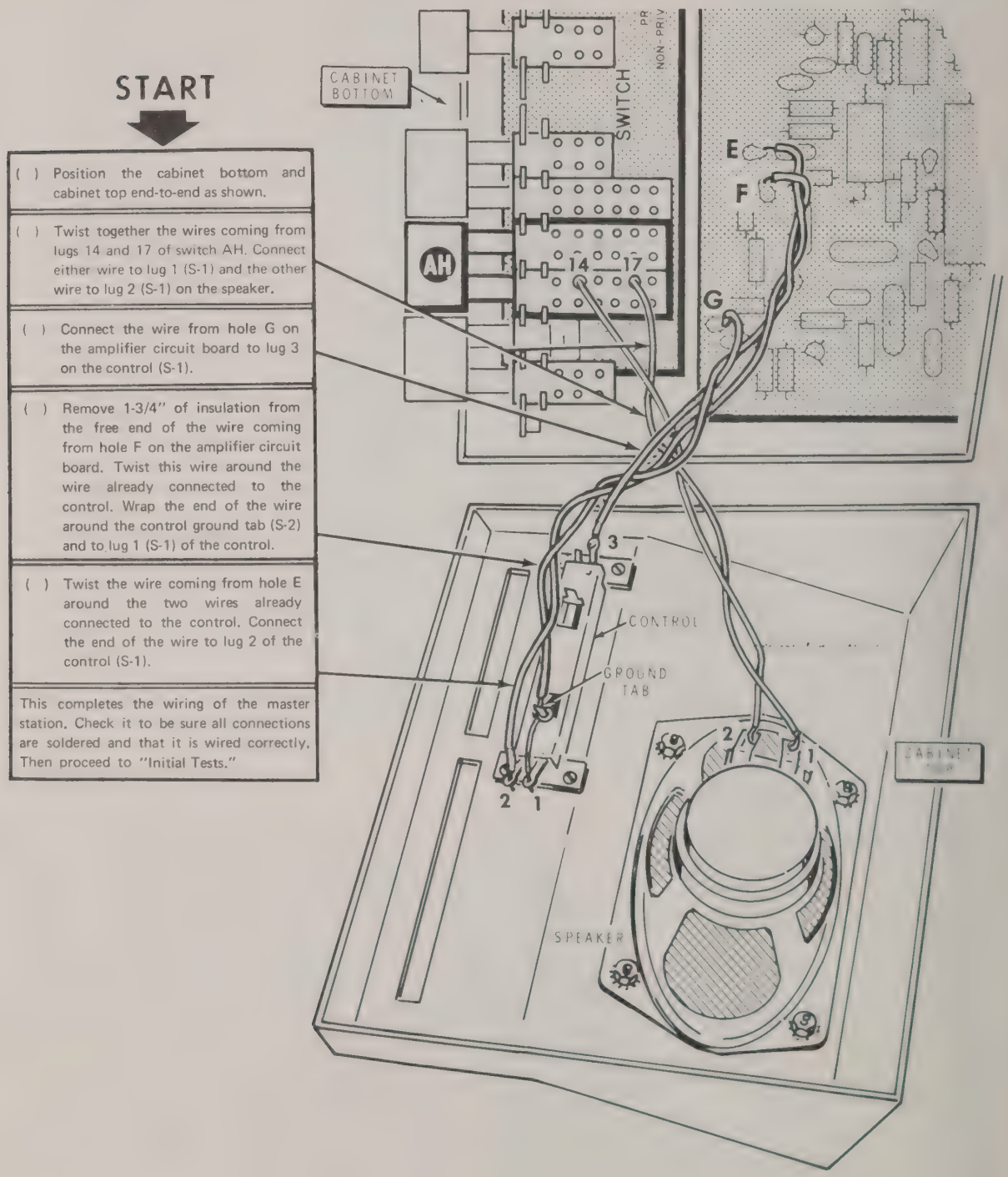
( ) Cut off lug 4 just below the eyelet.

( ) Mount the 50 kΩ control in the cabinet top as shown with four #2 x 1/4" sheet metal screws. Be sure the control is positioned as shown.

NOTE: In the following step, position the speaker grille with the speaker cutout area as shown.

( ) Turn the cabinet top over. Then carefully peel the protective backing from the speaker grille. Press the speaker grille onto the cabinet top. Do not press on the grille in the area of the speaker cutout, as the speaker grille can be dented.

( ) Locate the Heathkit label and remove the protective backing. Press this label in place on the speaker grille as shown.


START
( ) Position the cabinet bottom and cabinet top end-to-end as shown.
( ) Twist together the wires coming from lugs 14 and 17 of switch AH. Connect either wire to lug 1 (S-1) and the other wire to lug 2 (S-1) on the speaker.
( ) Connect the wire from hole G on the amplifier circuit board to lug 3 on the control (S-1).
( ) Remove 1-3/4" of insulation from the free end of the wire coming from hole F on the amplifier circuit board. Twist this wire around the wire already connected to the control. Wrap the end of the wire around the control ground tab (S-2) and to lug 1 (S-1) of the control.
( ) Twist the wire coming from hole E around the two wires already connected to the control. Connect the end of the wire to lug 2 of the control (S-1).
This completes the wiring of the master station. Check it to be sure all connections are soldered and that it is wired correctly. Then proceed to "Initial Tests."
CABINET BOTTOM
SWITCH
PR
NON-PRIV
AH
14
17
E
F
G
3
CONTROL
GROUND TAB
2
1
2
1
SPEAKER

PICTORIAL 13

INITIAL TESTS

PREPARATIONS

Refer to Figure 1 (fold-out from Page 25) for the following steps.

If you do not obtain the proper response in any of the following tests, recheck the wiring you did on Pictorials 6, 7, 11, and 13. If this is correct, refer to the "In Case of Difficulty" section on Page 41 to locate and correct the trouble. After you locate the trouble and correct it, return to this section of the Manual and complete the rest of the tests.

Ohmmeter Check

If you have an ohmmeter, perform the following two steps before you plug the Master in. If you do not have an ohmmeter, disregard these steps and proceed to the "Power on" check.

( ) Set your ohmmeter range switch to the RX10 position.

( ) Refer to Figure 1A (fold-out from Page 25) and measure the resistance across resistor R30. If the reading is lower than 40 Ω, inspect the circuit board carefully for solder bridges between foils, a faulty component, or for any other cause of a low resistance reading. NOTE: If your ohmmeter does not have an RX10 range, set the meter on the RX1 range. In this case the meter reading should not be lower than 8 ohms. The difference in resistance readings between the two ranges is occasioned by the presence of a diode in the circuit.

Power On Check

( ) Insert the line cord plug into an ac source. Then touch Q6 and Q8. If they are uncomfortably hot to touch, immediately unplug the unit and refer to the "In Case of Difficulty" section: repeat this step after you have located and corrected the difficulty.

( ) Unplug the unit and proceed with the following steps.

Test Connections

( ) Loosen all the terminal screws on the terminal board.

NOTE: An assembled GD-110 Master and one assembled remote station, either a GD-120 Indoor Remote or a GD-130 Outdoor Remote Station, are required for the following tests. Or, if you have only Master Stations in your system, perform the following tests using a Master Station and a #401-146 45 Ω speaker only (from another Master). It will be necessary to perform the following tests for each Master Station in your system.

( ) Prepare two 1-foot hookup wires by removing 3/8" of insulation from each end.

Connect these 1-foot wires to the remote station, or speaker, as directed in one of the following three steps.

( ) 1. For Model GD-130 Outdoor Remote Stations, solder one of the wires to each speaker lug.

NOTE: Refer to Figure 15 (fold-out from Page 45) to familiarize yourself with the controls before you begin the following tests.

( ) 2. For Model GD-120 Indoor Remote Stations, connect one wire at terminal 1 and the other wire at terminal 2 of the remote terminal board. Leave the TALK switch of this unit in the up position.

( ) 3. For Model GD-110 Master Stations, temporarily solder one of the wires to each lug of a #401-146 speaker.

( ) Position the remote station, or speaker, at least three feet from the Master Station to prevent acoustic feedback (squealing).

( ) Set the Master VOLUME control at midposition. Do not depress any switches on the Master or remote stations at this time.

NOTE: The four switch jumpers should, at this time, be plugged into the non-private bus of the switch circuit board. Do not move these jumpers to the private bus until directed to do so.

MASTER LISTENS TESTS

Refer to Figure 1 and note how the terminals are numbered on the terminal board.

( ) Connect the 1-foot wires coming from the remote station to terminals B1 and C1 on the terminal board by making a loop in the end of the wires and securing them under the terminal screws at B1 and C1.

NOTE: Keep the Master and the remote station, or speaker, at least three feet apart during the following tests.

( ) Plug the unit into an ac source.

( ) Gently tap the remote cabinet with the handle of a screwdriver. You should hear a tapping sound from the speaker of the Master Station.

NOTE: If you hear a squeal, reduce the volume and continue with the tests.

( ) Disconnect the wires from B1 and C1.

( ) In a similar manner, connect the remote wires to B2 and C2 on the terminal board. Then repeat the preceding test.

( ) Disconnect the wires from B2 and C2.

STATION #1

Non-Private

( ) Connect the remote wires to E1 and F1 on the terminal board.

( ) Depress and hold down the ALL CALL switch on the Master Station.

( ) Tap the Master Station cabinet and listen for response from the remote. Release the ALL CALL switch.

( ) Depress STATION SELECTOR switch #1 on the Master.

( ) Tap the remote cabinet and listen for a response from the Master.

( ) Depress and hold down the TALK switch at the Master. Then tap the Master station cabinet and listen for a response from the remote.

( ) Depress the DICTATE switch. Then tap the Master and listen for a response from the remote. Release the DICTATE switch.

( ) Release STATION SELECTOR switch #1. Disconnect the wire from E1 and connect it to D1.

Private

CAUTION: Unplug the Master from the ac power source before you change the position of the jumper wires in any of the following steps. Refer to Figure 2 to more easily identify the different jumper wires. Use long-nose pliers to move the jumper wires.

( ) Remove the #1 jumper from the non-private bus and connect it to the private bus at the #1 location.

( ) Hold down the ALL CALL switch, tap the Master cabinet, and listen for a response from the remote.

( ) Depress STATION SELECTOR switch #1 and hold down the TALK switch, tap the Master cabinet, and listen for a response from the remote.

( ) Release STATION SELECTOR switch #1. Disconnect the wires from D1 and F1.

STATION #2

Non-Private

( ) Connect the remote wires to E2 and F2 on the terminal board.

( ) Hold down the ALL CALL switch on the Master, tap the Master cabinet, and listen for a response from the remote. Release the ALL CALL switch.

( ) Depress STATION SELECTOR switch #2. Tap the remote cabinet and listen for a response from the Master.

( ) Hold down the TALK switch, tap the Master cabinet, and listen for a response from the remote.

( ) Release STATION SELECTOR switch #2. Disconnect the wire from E2 and connect it to D1.

Private

( ) Unplug the #2 jumper from the non-private bus and connect it to the private bus at the #2 location.

( ) Hold down the ALL CALL switch, tap the Master cabinet and listen for a response from the remote.

( ) Depress STATION SELECTOR switch #2 and hold down the TALK switch, tap the Master cabinet, and listen for a response from the remote.

( ) Release STATION SELECTOR switch #2. Disconnect the wires from D1 and F2.

STATION #3

Non-Private

( ) Connect the remote wires to E3 and F3 on the terminal board.

( ) Hold down the ALL CALL switch, tap the Master cabinet, and listen for a response from the remote. Release the ALL CALL switch.

( ) Depress STATION SELECTOR switch #3. Tap the remote cabinet and listen for a response from the Master.

( ) Hold down the TALK switch, tap the Master cabinet, and listen for a response from the remote.

( ) Release STATION SELECTOR switch #3. Disconnect the wire from E3 and connect it to D3.

Private

( ) Unplug the #3 jumper from the non-private bus and connect it to the private bus at the #3 location.

( ) Hold down the ALL CALL switch, tap the Master cabinet, and listen for a response from the remote.

( ) Depress STATION SELECTOR switch #3 and hold down the TALK switch, tap the Master cabinet, and listen for a response from the remote.

( ) Release STATION SELECTOR switch #3. Disconnect the wires from D3 and F3.

STATION #4

Non-Private

( ) Connect the remote wires to E4 and F4 on the terminal board.

( ) Hold down the ALL CALL switch, tap the Master cabinet, and listen for a response at the remote. Release the ALL CALL switch.

( ) Depress STATION SELECTOR switch #4. Tap the remote cabinet and listen for a response from the Master.

( ) Hold down the TALK switch at the Master station, tap the Master cabinet, and listen for a response from the remote.

( ) Release STATION SELECTOR switch #4. Disconnect the wire from E4 and connect it to D3.

Private

( ) Unplug the #4 jumper from the non-private bus and connect it to the private bus at the #4 location.

( ) Hold down the ALL CALL switch, tap the Master cabinet, and listen for a response from the remote.

( ) Depress STATION SELECTOR switch #4 and hold down the TALK switch, tap the Master cabinet, and listen for a response from the remote.

( ) Release STATION SELECTOR switch #4. Disconnect the wires from D3 and F4.

STATION #5 PRIVATE ONLY

( ) Connect the remote wires to F5 and D4 on the terminal board.

( ) Hold down the ALL CALL switch, tap the Master cabinet, and listen for a response from the remote. Release the ALL CALL switch.

( ) Depress STATION SELECTOR switch #5. Hold down the TALK switch, tap the Master cabinet, and listen for a response from the remote.

( ) Release STATION SELECTOR switch #5. Disconnect the wire from F5 and connect it to F6.

STATION #6 PRIVATE ONLY

( ) Hold down the ALL CALL switch, tap the Master cabinet, and listen for a response from the remote. Release the ALL CALL switch.

( ) Depress the STATION SELECTOR switch #6. Hold down the TALK switch, tap the Master cabinet, and listen for a response from the remote.

( ) Release STATION SELECTOR switch #6.

( ) Disconnect the Master from the ac source. Disconnect and discard the two 1-foot hookup wires.

The preceding tests will completely check out a Master Station except for the Master-to-Master connections on the terminal board (A1, A2, etc.). Therefore, if you encounter any trouble with signals from another Master, the difficulty is most likely due to poor solder joints or wiring errors on the six 15 kΩ resistors on the terminal board. These resistors are only used when one Master Station is connected to another Master Station.

NOTE: Repeat the preceding tests for each Master Station in your system.

This completes the "Initial Tests." Proceed to the "Installation" section.

INSTALLATION

This part of the Manual contains four sections that will help you plan and install your intercom system: "Intercom Unit Characteristics," "Typical Intercom Systems," "Basic Wiring Hookups," and "Installing Your System." The first of these sections, "Intercom Unit Characteristics," will help you to fully understand the capabilities of each part of your system.

INTERCOM UNIT CHARACTERISTICS

GD-110 MASTER UNIT

1. A Master operates as a control unit when connected to remote stations.

2. Any one Master can communicate with a total of six other stations (other Masters, Indoor Remotes, or Outdoor Remotes) which are connected to it.

3. A Master can call any one station or all stations connected to it (ALL CALL), or it can listen to all six remotes at the same time.

4. A Master can listen in on non-private stations (stations #1 through #4 can be wired as non-private remotes).

5. A Master can be called by either a private or a non-private remote station (Model GD-120 Indoor Remote Station) or by another Master.

6. Connected Masters can function independently, as Masters, communicating with their own remotes only. A Master cannot be used to "tie in" a remote from another master to one of its own remotes.

7. No remote can talk or listen to any other remote.

Private, Non-Private Jumper Wires

Movable jumper wires for STATION SELECTOR switches #1 through #4 make it possible to operate these four remote stations either as private or non-private remotes. The #5 and #6 STATION SELECTOR switches are permanently connected in the private mode. The D and F terminals on the terminal board are used for private operation, and the E and F terminals are used for non-private operation — in conjunction with the position of the jumper wires in the Master.

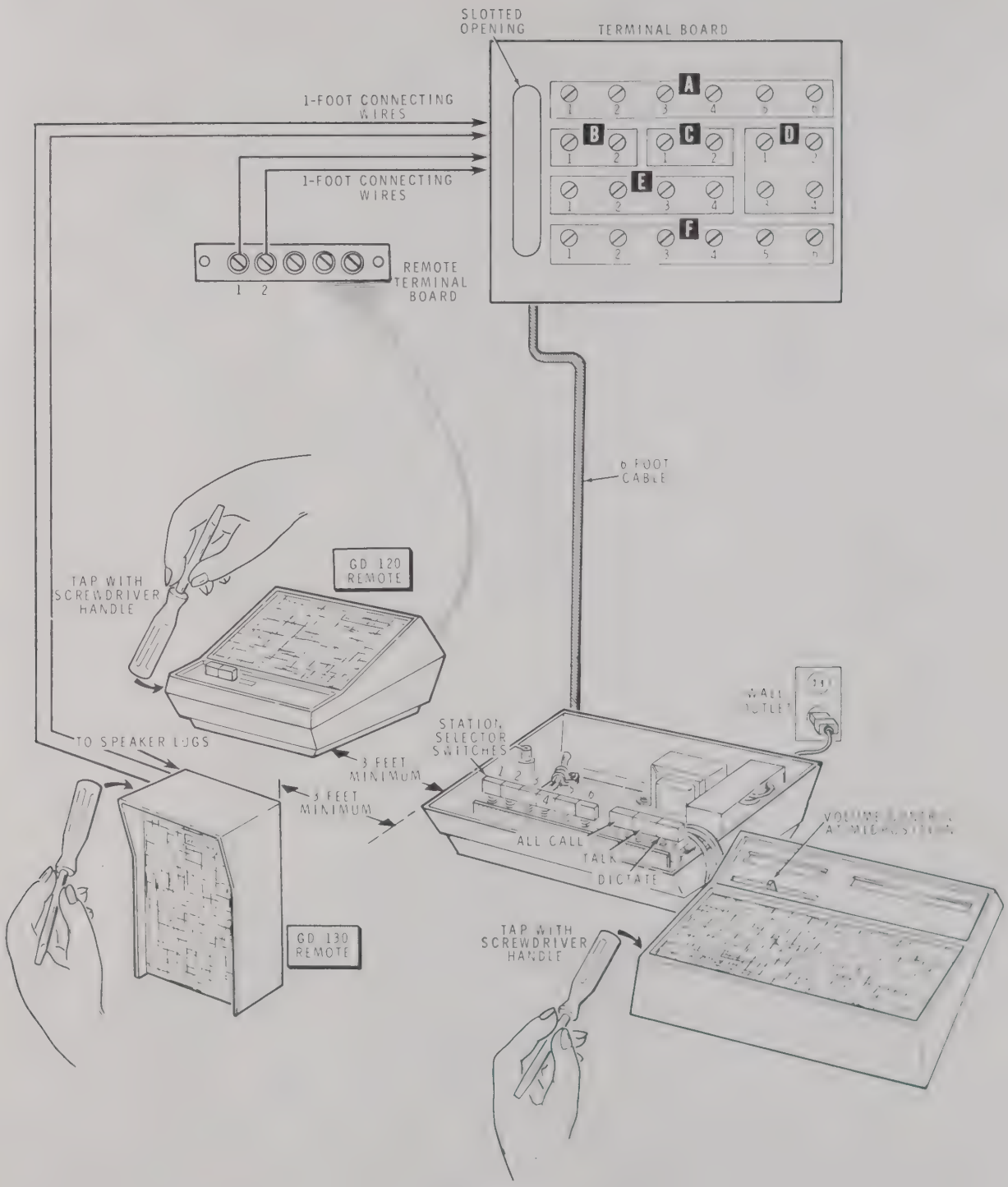

SLOTTED OPENING
TERMINAL BOARD
1-FOOT CONNECTING WIRES
1-FOOT CONNECTING WIRES
REMOTE TERMINAL BOARD
1 2
A
B
C
D
E
F
6 FOOT CABLE
TAP WITH SCREWDRIVER HANDLE
GD 120 REMOTE
WALL OUTLET
TO SPEAKER LUGS
STATION SELECTOR SWITCHES
3 FEET MINIMUM
3 FEET MINIMUM
ALL CALL
TALK
DICTATE
VOLUME CONTROL AT MICROPHONE
GD 130 REMOTE
TAP WITH SCREWDRIVER HANDLE

Figure 1

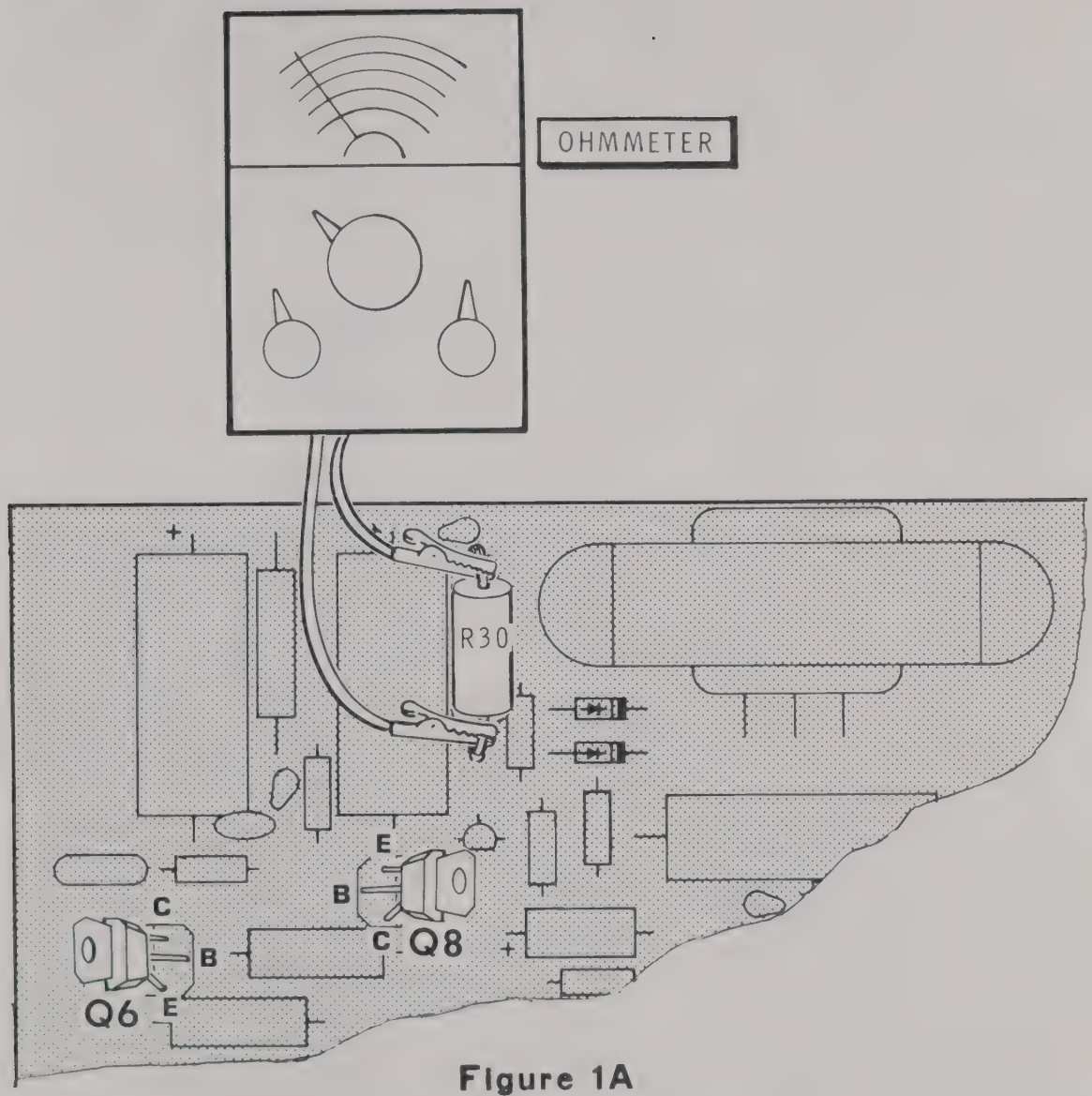


Figure 1A

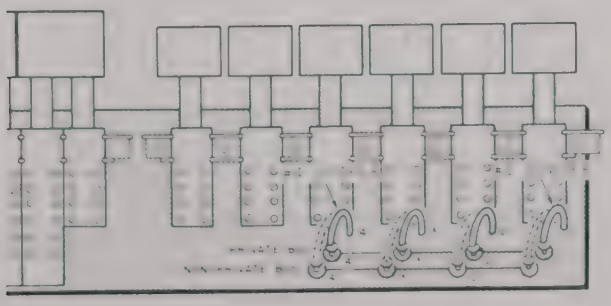


Figure 2

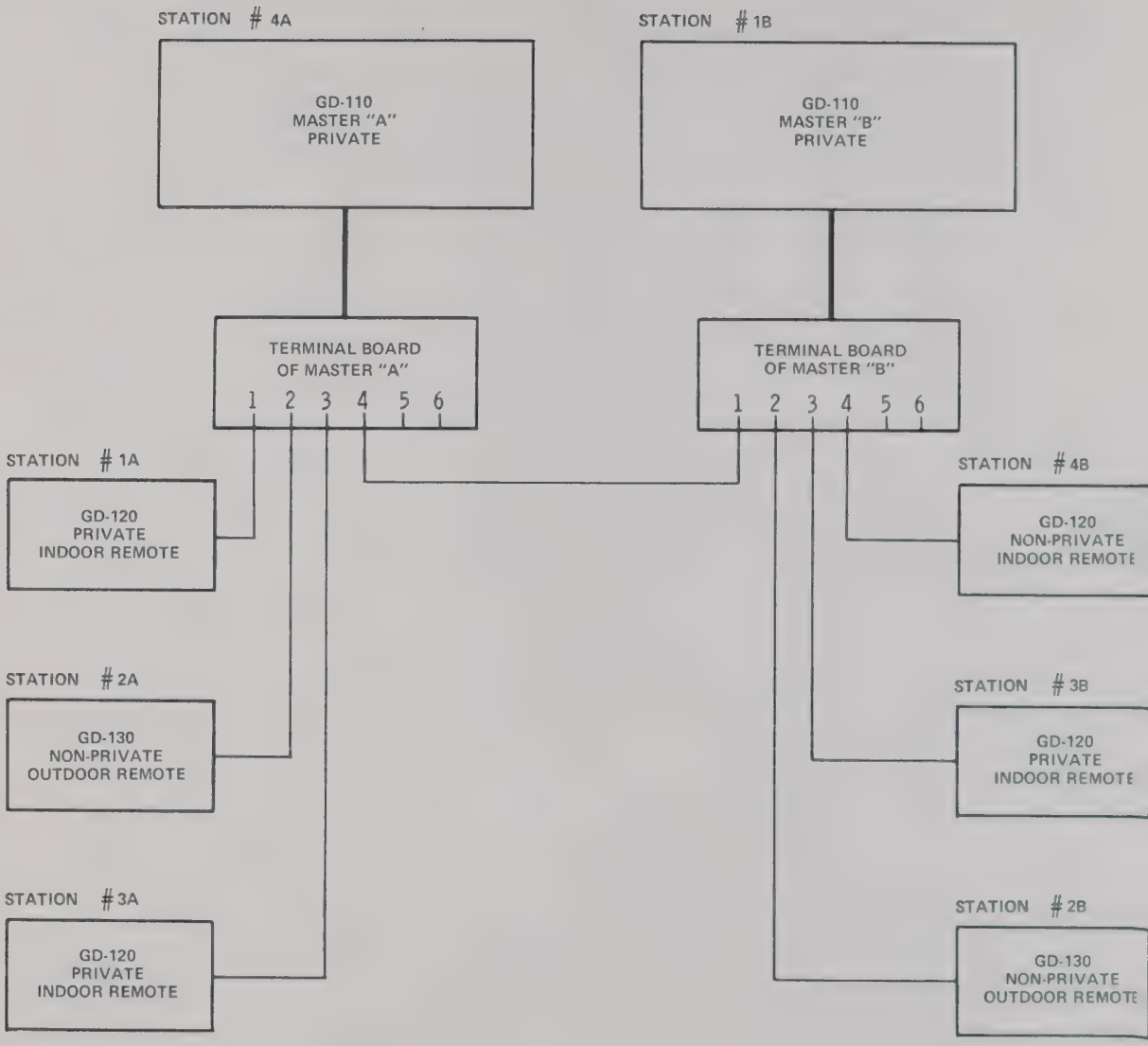

STATION # 4A
GD-110
MASTER "A"
PRIVATE
STATION # 1B
GD-110
MASTER "B"
PRIVATE
TERMINAL BOARD
OF MASTER "A"
1 2 3 4 5 6
TERMINAL BOARD
OF MASTER "B"
1 2 3 4 5 6
STATION # 1A
GD-120
PRIVATE
INDOOR REMOTE
STATION # 2A
GD-130
NON-PRIVATE
OUTDOOR REMOTE
STATION # 3A
GD-120
PRIVATE
INDOOR REMOTE
STATION # 4B
GD-120
NON-PRIVATE
INDOOR REMOTE
STATION # 3B
GD-120
PRIVATE
INDOOR REMOTE
STATION # 2B
GD-130
NON-PRIVATE
OUTDOOR REMOTE

Figure 5

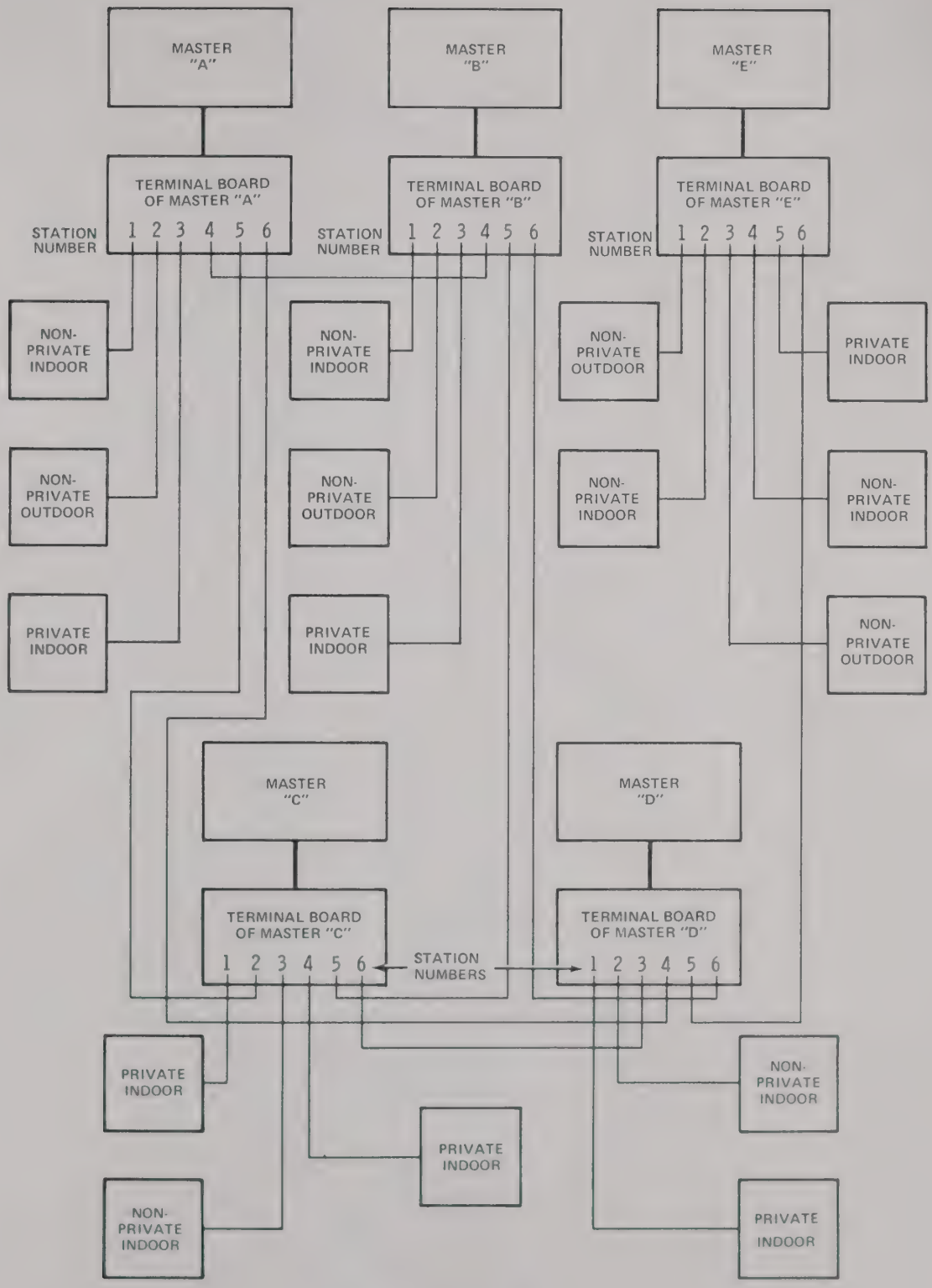

MASTER "A"
MASTER "B"
MASTER "E"
TERMINAL BOARD OF MASTER "A"
TERMINAL BOARD OF MASTER "B"
TERMINAL BOARD OF MASTER "E"
STATION NUMBER 1 2 3 4 5 6
STATION NUMBER 1 2 3 4 5 6
STATION NUMBER 1 2 3 4 5 6
NON-PRIVATE INDOOR
NON-PRIVATE INDOOR
NON-PRIVATE OUTDOOR
PRIVATE INDOOR
NON-PRIVATE OUTDOOR
NON-PRIVATE OUTDOOR
NON-PRIVATE INDOOR
PRIVATE INDOOR
PRIVATE INDOOR
NON-PRIVATE INDOOR
NON-PRIVATE OUTDOOR
MASTER "C"
MASTER "D"
TERMINAL BOARD OF MASTER "C"
TERMINAL BOARD OF MASTER "D"
1 2 3 4 5 6 STATION NUMBERS 1 2 3 4 5 6
PRIVATE INDOOR
PRIVATE INDOOR
NON-PRIVATE INDOOR
NON-PRIVATE INDOOR
PRIVATE INDOOR

Figure 6

WIRES CONNECTED TO:	FURNISH:
A	Input signals to the Master from other Masters.
B and C	Input signals to the Master from remotes with call-in.
D	Ground for signals going to or from A or F terminals.
E and F	Non-private remote input and output signals.
F	Also furnishes output signals to other Masters and private remotes.

Junction Box Diagram

The above list explains the purpose of the different groups of terminals on the Master Station terminal board. Refer to Figure 3A, which identifies each of the lettered and numbered terminals.

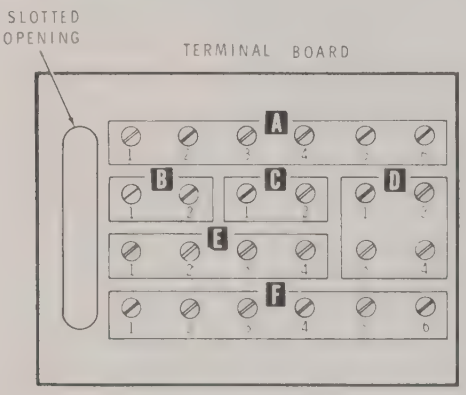


Figure 3A

The block diagram at the bottom of the junction box diagram label, see Figure 3B, illustrates connections which can be made between a Master and remotes (either private or non-private) or a Master and other Masters. The numbers are the numbers of the screw terminals or speaker lugs on the remote stations. The letters refer to terminal groups on a Master Station terminal board.

GD-120 INDOOR REMOTE

Private

1. The Model GD-120 Indoor Private Remote can "talk" or "listen" to the Master it is connected to. It cannot "talk to" or "listen to" any other remote station, or to any other Master except the one it is connected to.

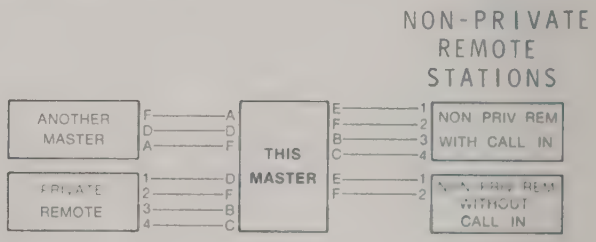


Figure 3B

2. Sounds in the area of the remote unit cannot be heard at the Master unless the TALK or DICTATE switch of the remote is depressed.

3. The remote can initiate a call to its Master at any time that the Master's TALK switch is in the Listen position.

Non-Private

1. The Model GD-120 Indoor Non-Private Remote is the same as the Indoor Private Remote except that is can be heard by the Master at any time, without the remote's TALK switch being depressed.

GD-130 OUTDOOR REMOTE

Non-Private Only

1. The Model GD-130 Outdoor Remote operates only in the non-private mode and is controlled solely by the Master it is connected to. It cannot talk to or listen to any other remote, or to any Master except the one it is connected to. It does not initiate a call to the Master but can be heard by the Master whenever the proper STATION SELECTOR switch is depressed at the Master.

TYPICAL INTERCOM SYSTEMS

Figures 4, 5, and 6 are typical intercom systems which can be made from the GD-110 Master, the GD-120 Indoor Remote, and the GD-130 Outdoor Remote units. Figure 4 shows only one Master station and up to six remotes (four of which can be non-private). Figure 5 (fold-out from Page 26) shows two Master stations connected to each other, with remote stations connected to each of them. Figure 6 shows five interconnected Master stations, each of which has its own remote stations. Note that Master E is the only Master connected to Master D, and that it can only talk to Master D or its own remotes.

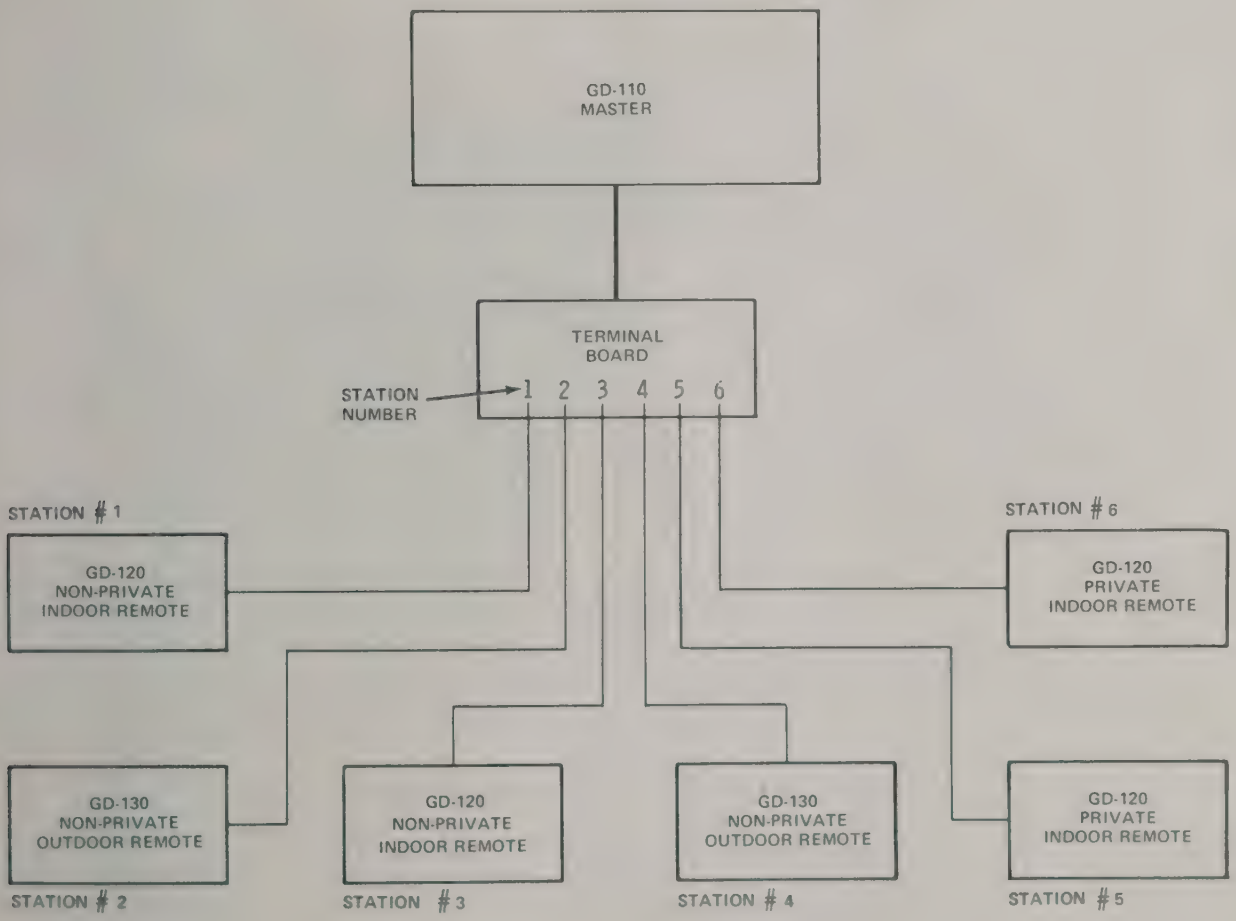


Figure 4

BASIC WIRING HOOKUPS

Figures 7, 8, 9, and 10 show the wiring hookups between individual units, and Figure 11 shows the wiring of a complete system. Note that two wires are required between a Master and a Model GD-130 Outdoor Remote, three wires are required between two Masters, and four wires are required between a Master and a Model GD-120 Indoor Remote. Wiring connections are also shown on the bottom of the junction box diagram (shown in Figure 3B).

PRIVATE REMOTE WITH "CALL IN" TO MASTER STATION

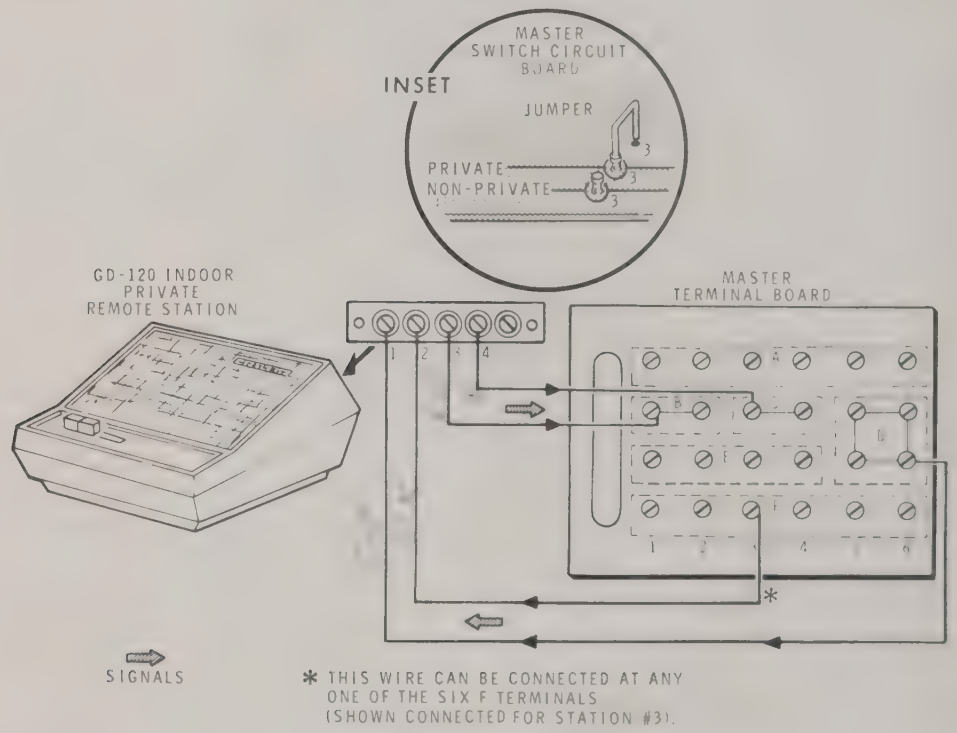


Figure 7
Basic Wiring Hookup — Master and Private Remote

This remote can initiate a call to the Master, but cannot be heard by the Master except when the remote's TALK or DICTATE switch is depressed.

NON-PRIVATE REMOTE WITH "CALL IN" TO MASTER STATION

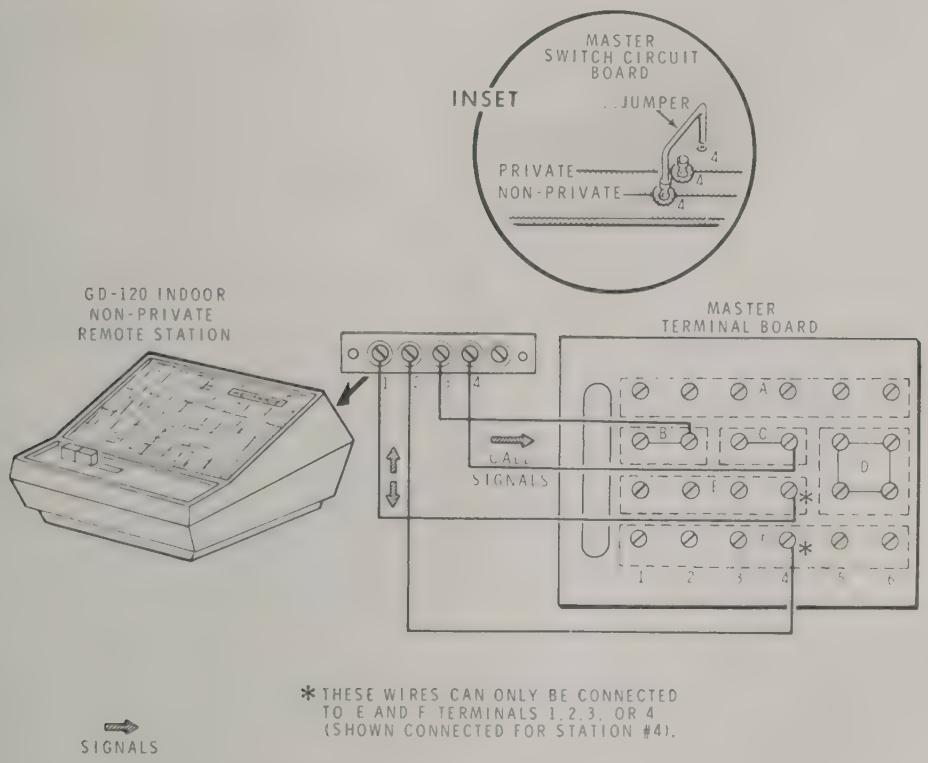


Figure 8
Basic Wiring Hookup — Master and Non-Private Remote

This remote can initiate calls to the Master, and can be heard by the Master at any time. Wires to E and F must go to terminals of the same number (E1 and F1, E2 and F2, etc.).

NON-PRIVATE REMOTE WITHOUT "CALL IN" TO MASTER STATION

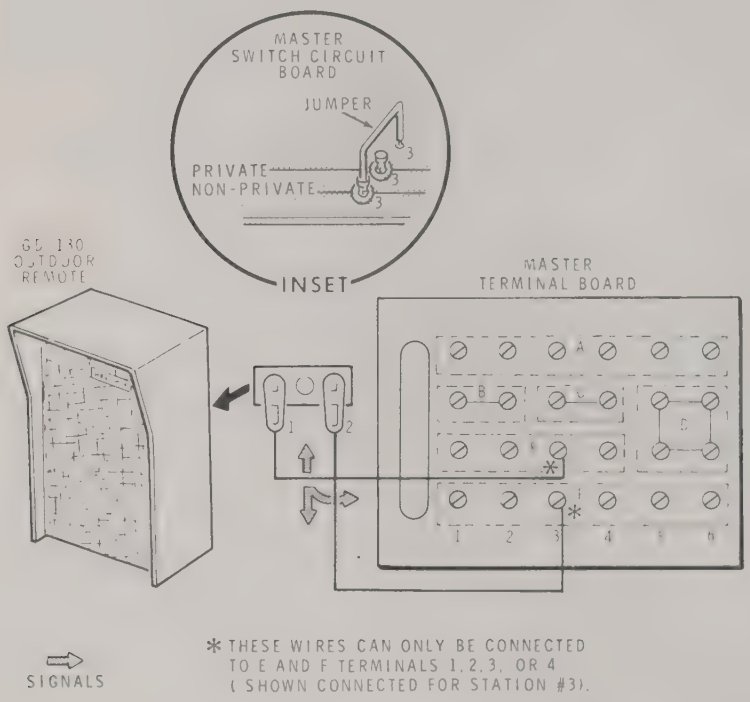


Figure 9
Basic Wiring Hookup — Master and Outdoor Non-Private Remote

This remote can be heard by the Master at any time. It cannot initiate a call to the Master.

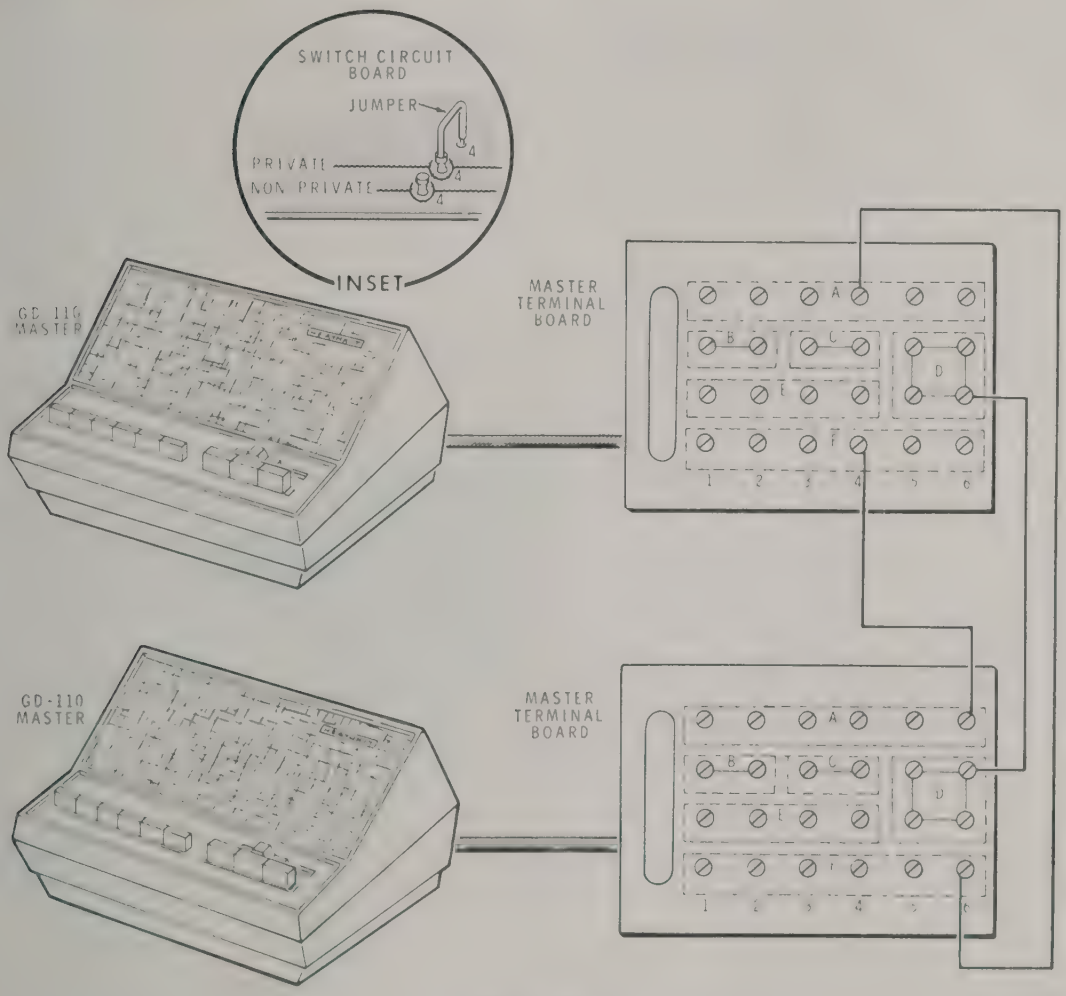
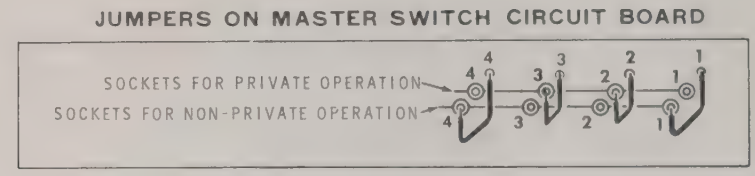


Figure 10
Basic Wiring Hookup — Master and Another Master

A Master can talk with other Masters individually, or it can talk to all other Masters simultaneously. It cannot be heard by other Masters except when its TALK switch is depressed. It cannot talk to or listen to remotes connected to any other Master.

NOTE: No jumper wires are provided for station 5 or station 6. These two stations are permanently connected for private operation.

COMPLETE SYSTEM WIRING



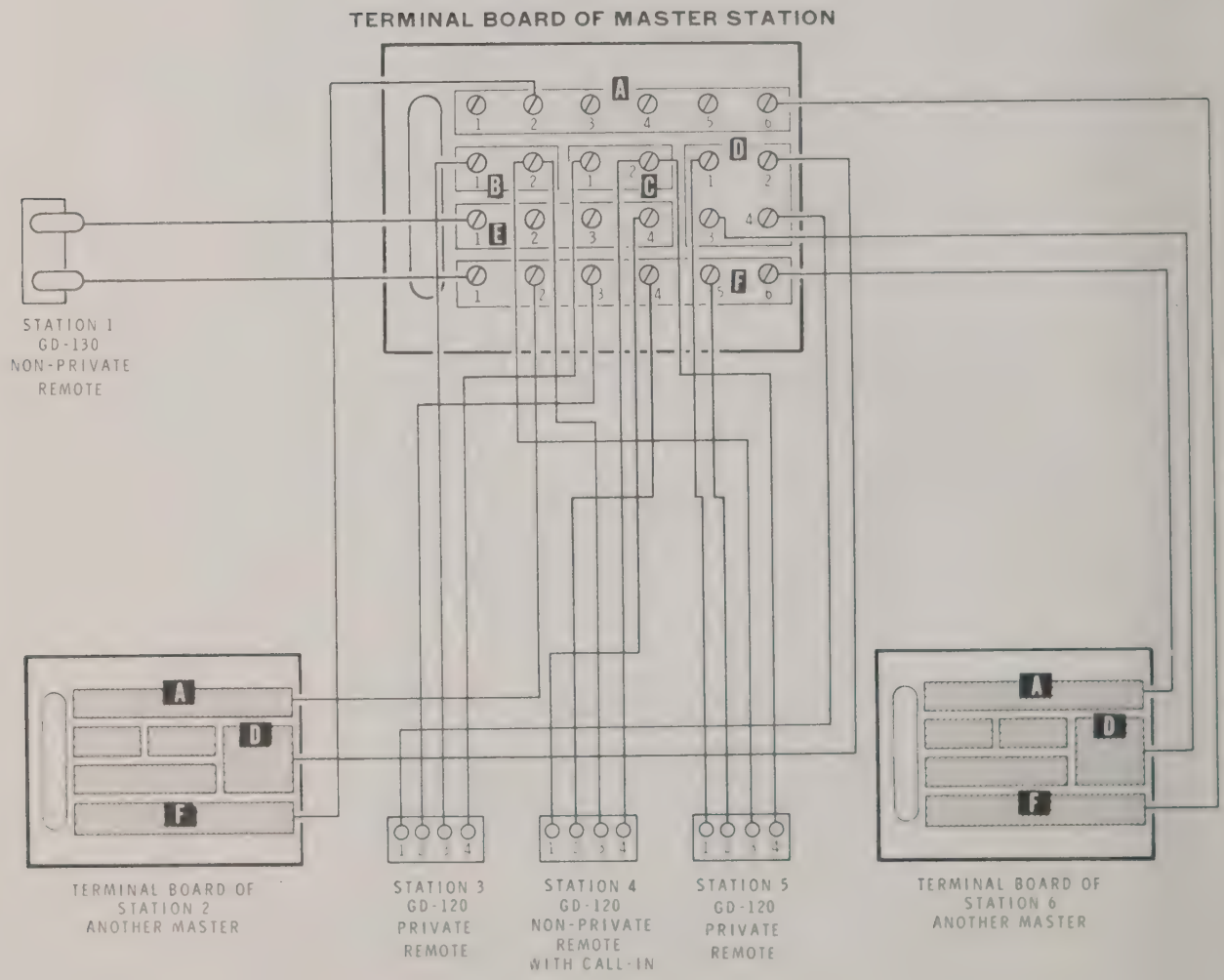


Figure 11

INSTALLING YOUR SYSTEMS

Select a location for each unit and for the terminal board of each master. Units may be either placed on a desk or wall-mounted. Be sure there is sufficient slack in the cable to allow a Master to be moved if it is not to be wall-mounted.

Because the terminal board can be mounted either with the double-sided foam adhesive tape or with the #6 x 1/2" sheet metal screws (see Page 34), it will only be necessary to use one of the next two groups of steps. Then proceed to "Terminal Board Wiring."

TERMINAL BOARD INSTALLATION WITH TAPE

Refer to Figure 12 for the following steps.

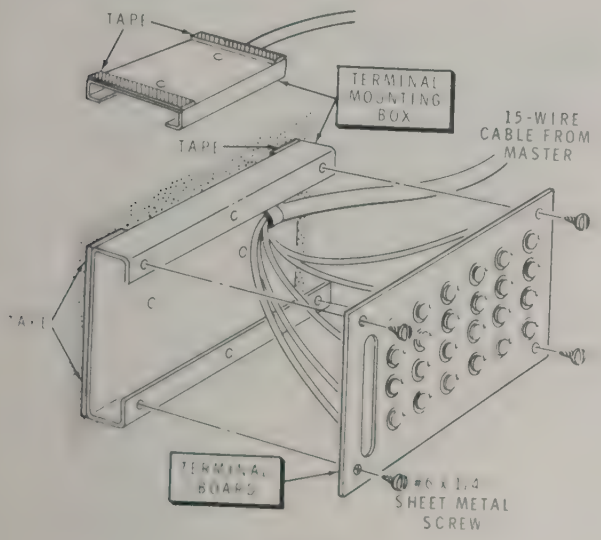


Figure 12

( ) Cut the double-sided foam adhesive tape into two equal lengths.

( ) Peel the protective backing from one side of a length of the foam adhesive tape. Press this side of the tape as shown onto the terminal mounting box with the edge of the tape even with the outer edge of the mounting box.

( ) In a similar manner, install the other length of tape.

( ) Remove the protective backing from the outer side of each length of tape.

( ) Carefully position the terminal mounting box in the location you have chosen for it and press it onto the mounting surface.

( ) Assemble the terminal board to the mounting box using #6 x 1/4" sheet metal screws.

Proceed to "Terminal Board Wiring."

TERMINAL BOARD INSTALLATION WITH SCREWS

Refer to Figure 13 for the following steps.

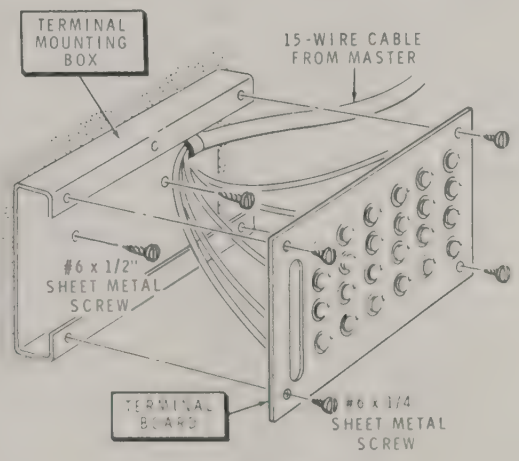


Figure 13

( ) Remove the four #6 x 1/4" sheet metal screws and position the terminal board away from the center holes of the terminal mounting box.

( ) Place the terminal board, terminal mounting box, and cable in the desired mounting position and mark the location of the two screw holes on the mounting surface.

( ) Start the #6 x 1/2" mounting screws in the marked locations and secure the terminal mounting box to the mounting surface.

( ) Assemble the terminal board to the mounting box using the #6 x 1/4" sheet metal screws.

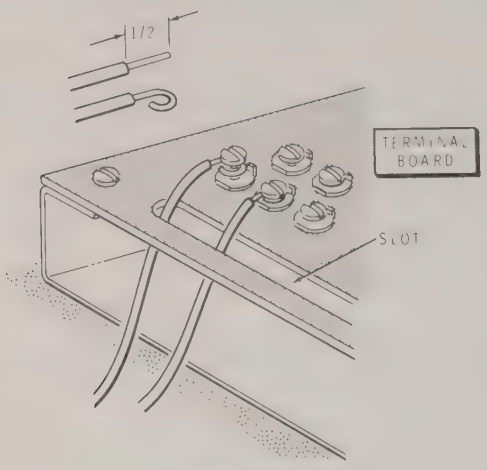


Figure 14

TERMINAL BOARD WIRING

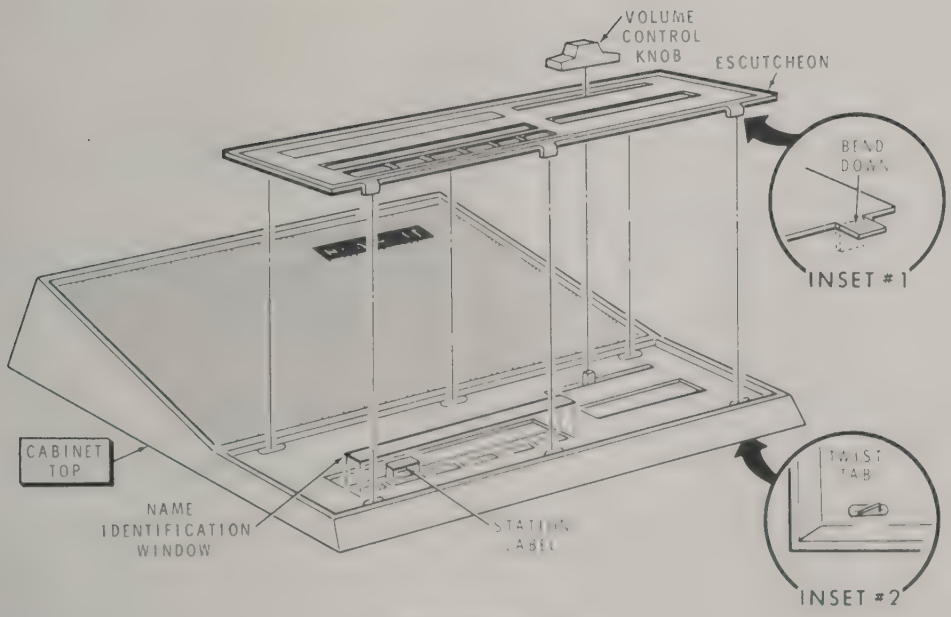
( ) When all terminal boards are installed and all master and remote stations are positioned where they will be used, run the connecting wires between the stations. Allow some extra wire length at any wall-mounted remote station so it will be easier to make the connections.

( ) Refer to Figure 14 and remove 1/2" of insulation from the ends of the connecting wires. Form a hook in the end of each wire as shown.

( ) Pass the intercom wires through the slot near the edge of the terminal board. Then place each wire end under the correct terminal board mounting screw and carefully tighten down the screw on the wire. Note that there may be more than one wire under some screws and no wires under other screws.

NOTE: Instructions for wall-mounting your Master station are given in the next section, "Final Assembly."

FINAL ASSEMBLY



PICTORIAL 14

Refer to Pictorial 14 for the following steps.

( ) Position the cabinet top as shown.

( ) Select the remote station labels you wish to use from the name identification label sheet. If you use a blank label, type or print in the station name before detaching the label from the sheet.

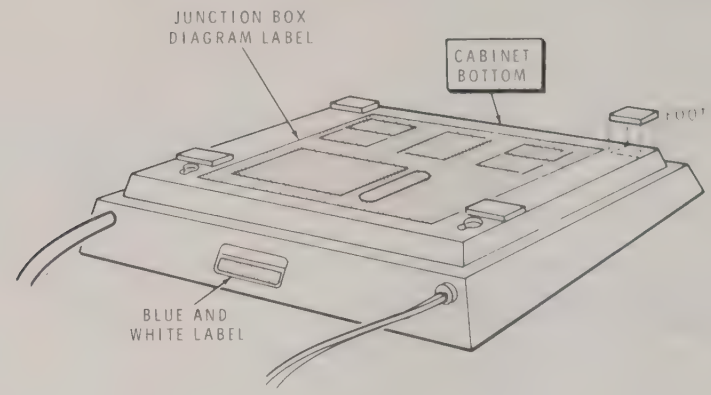
( ) Detach the labels from the label sheet and place them in the proper recessed areas in front of the Station Selector switches.

( ) Locate the name identification window. If there is a protective backing, remove it. Then place the window over the station labels, as shown.

( ) As shown in inset drawing #1, bend the tabs of the escutcheon vertically to fit the slots in the cabinet top. Then install the escutcheon over the station switches, identification window, and Volume control lever. Twist the tabs slightly as shown in inset drawing #2 to hold the escutcheon tightly in place.

( ) If the escutcheon has a transparent protective film on it, remove the film.

( ) Press the Volume control knob onto the Volume control lever.



PICTORIAL 15

Refer to Pictorial 15 for the following steps.

NOTE: The connecting cable from the Master to the terminal board should have enough slack to allow you to move the Master cabinet for the following steps.

( ) Position the cabinet bottom as shown.

( ) Remove the backing from the rubber feet and press them onto the cabinet bottom at the locations shown. Be sure the edges of the feet are flush with the edges of the cabinet and positioned as shown.

( ) Carefully remove the paper backing from the Junction Box Diagram label and press it onto the cabinet bottom between the feet. The upper and lower edges of this label should be approximately centered on the cabinet bottom.

NOTE: The blue and white label which will be installed in the following step shows the Model number and the Production Series number of your kit. Refer to these numbers in any communications with the Heath Company about this kit.

( ) Remove the paper backing from the blue and white label and press it onto the outside back of the cabinet bottom. Turn the cabinet bottom over.

JUMPER CHECK

( ) Check the location of each jumper to be sure it is plugged into the proper bus.

( ) Be sure all the jumpers are installed tightly in the wire sockets.

NOTE: If the Master Station unit is to be wall-mounted, perform the following five steps. If it is to be used on a desk, table, or shelf, disregard these steps and proceed to "Terminal Board Assembly."

WALL MOUNTING

Refer to Pictorial 16 for the following steps.

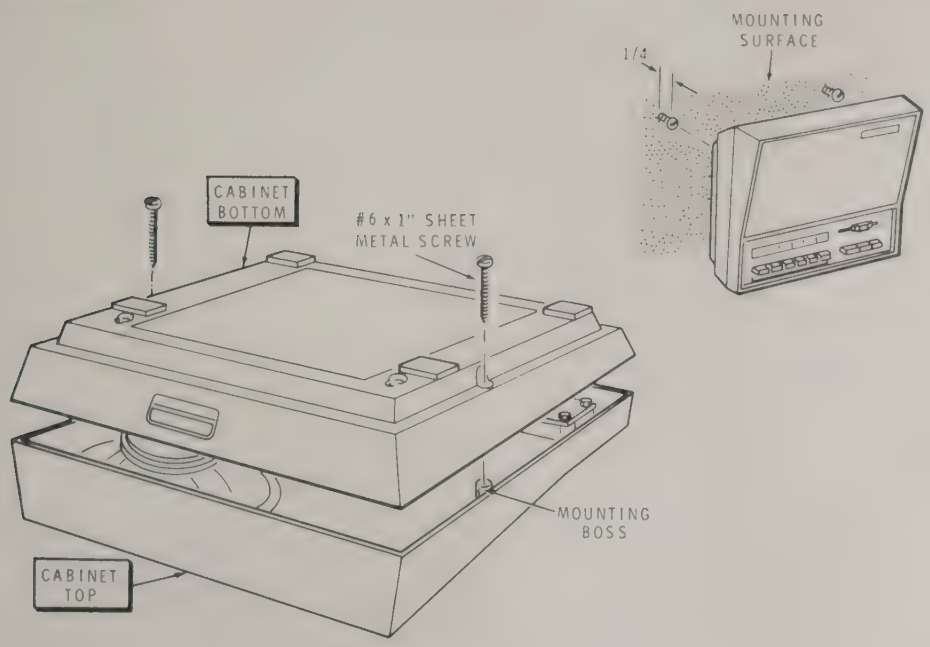
( ) Detach the wall-mounting template.

( ) Tape the wall-mounting template on the wall, or other mounting surface, in the location you have chosen for the Master Station. Be sure to note the position of the outline of the cabinet if you have to be concerned about clearance around the cabinet after it is installed.

( ) Using a pointed object such as a nail or awl, make starter holes at the hole locations on the template.

( ) Remove the template and drill a .120" diameter hole (approximately 1/8" diameter) to a depth of 7/8" at the starter holes.

( ) Drive the #6 x 1" sheet metal screws into the mounting surface to a depth which will leave 1/4" space between the mounting surface and the head of the screw.



PICTORIAL 17

CABINET ASSEMBLY

Refer to Pictorial 17 for the following steps.

CAUTION: Be sure all wiring inside the Master Station is positioned away from the edges of the cabinet and away from all the switches before you assemble the cabinet top and bottom in the next step.

( ) Using two #6 x 1" sheet metal screws, assemble the cabinet top to the cabinet bottom, as shown.

( ) Place the Master Station on the two wall-mounting screws, if it is to be wall-mounted, or locate it on a desk, table, or shelf where it is to be used.

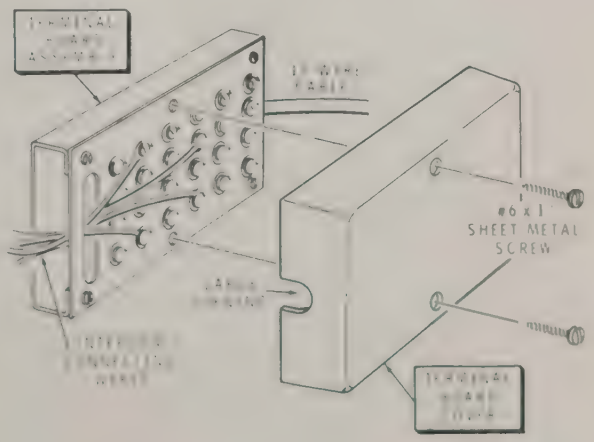
TERMINAL BOARD ASSEMBLY

Refer to Pictorial 18 for the following steps.

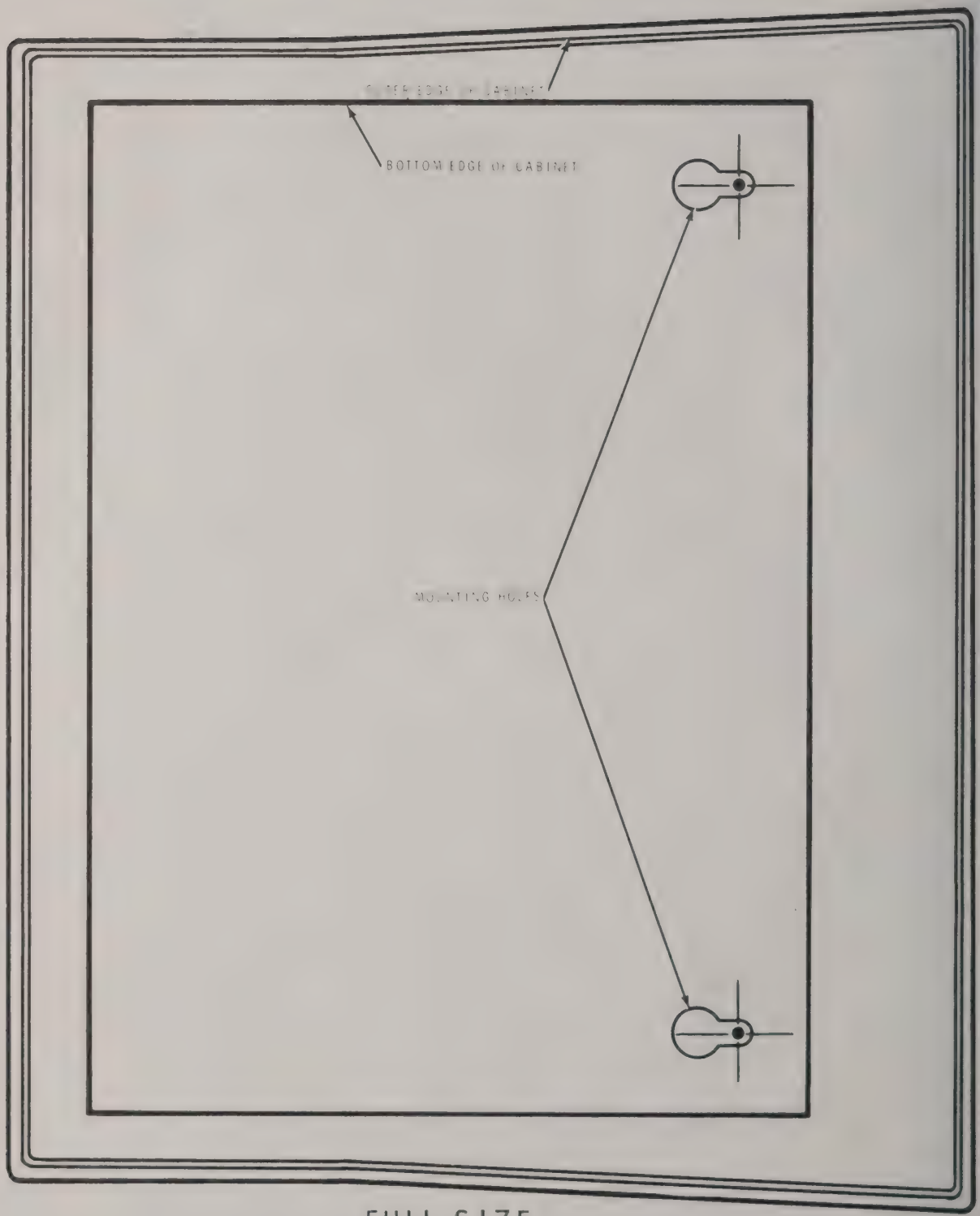
( ) Position the 15-wire cable and the intercom wires from the terminal board screw terminals as shown. Be sure the intercom wires go through the slot at the edge of the terminal board.

( ) Place the terminal board cover over the cable, intercom wires, and terminal board. Fasten it to the terminal mounting box with two #6 x 1" sheet metal screws.

This completes the assembly.

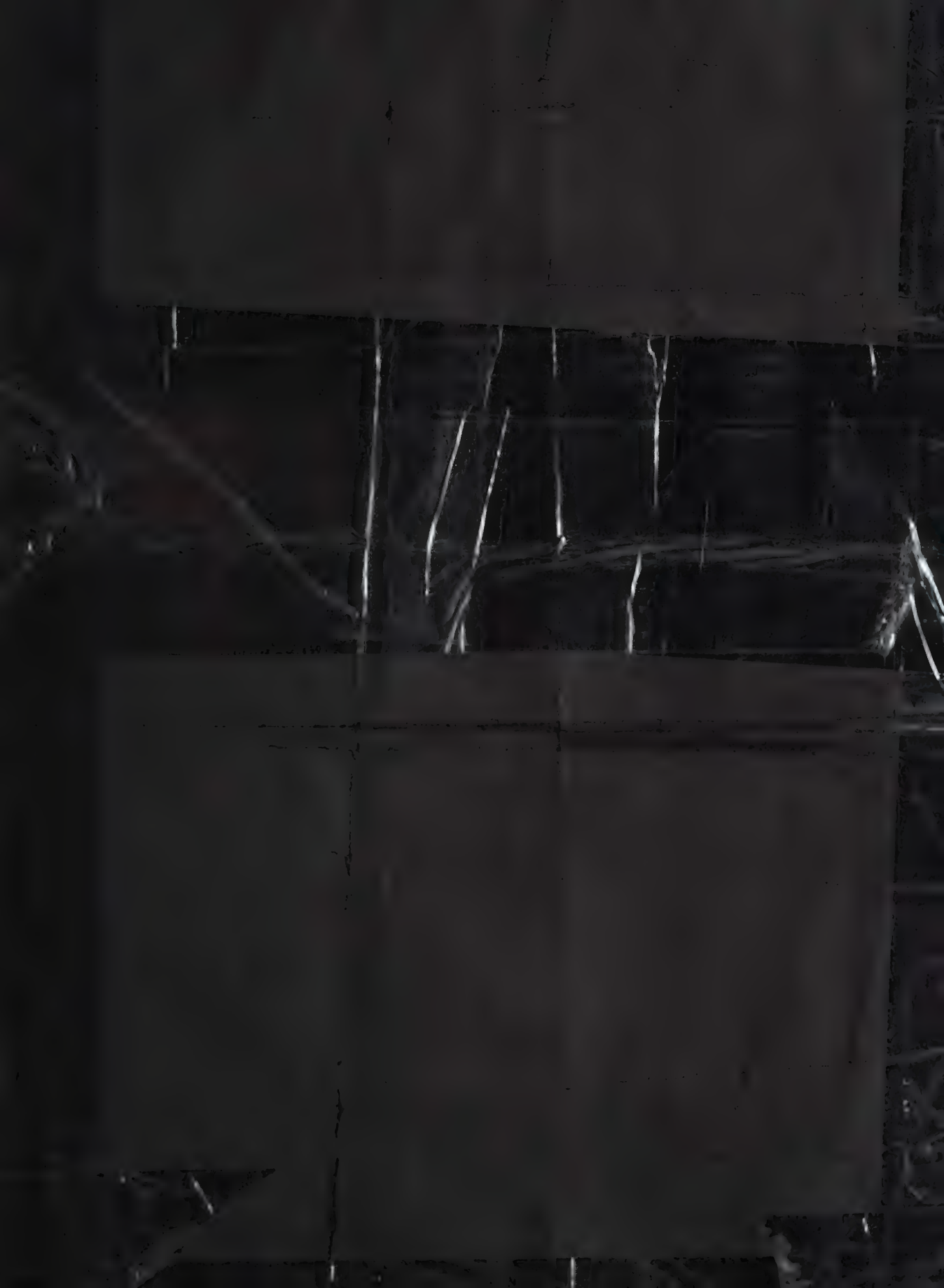


PICTORIAL 18



FULL SIZE
WALL MOUNTING TEMPLATE

PICTORIAL 16



OPERATION

VOLUME
Move the knob to the right to increase the volume.
STATION SELECTOR SWITCHES
Press in to select the desired station or stations. Press in again to release.
DICTATE
Press into the down position to dictate. Press down again to release.
ALL CALL
Hold down to talk to all stations at the same time.
TALK
Hold down to talk. Release to listen.

Figure 15

The Master Station controls are quite simple to operate, as shown in Figure 15. Speak in a normal conversational tone, at least two feet from the Master, when talking to one of the other stations.

Set the VOLUME control for clear, undistorted reception by asking someone to listen to a remote station while you adjust the control. Remember that the VOLUME control also controls the listening level of incoming signals to the Master.

The Master Station cannot listen to, or monitor, a private remote or another Master unless the other station has its TALK or DICTATE switch pressed down. A call from a Master cannot be received at a private station if it inadvertently leaves its DICTATE switch in the down position.

A non-private remote station can be listened to, or monitored, by the Master any time the Master has the STATION SELECTOR switch depressed for that channel. The Model GD-130 Outdoor Non-Private Remote Station cannot initiate a call to the Master unless the proper STATION SELECTOR switch is depressed at the Master. The Model GD-120 Indoor Remote Station can initiate a call to the Master any time the remote's TALK or DICTATE switch is depressed.

IN CASE OF DIFFICULTY

Refer to the "Identification Photograph" on Page 53 and "Circuit Board X-Ray Views" on Pages 54 and 55 for help in locating parts.

1. Recheck the wiring. Trace each lead in colored pencil on the Pictorial as it is checked. It is frequently helpful to have a friend check your work. Someone who is not familiar with the unit may notice something consistently overlooked by the builder.

2. About 90% of the kits that are returned for repair do not function properly due to poor connections and soldering. Therefore, many troubles can be eliminated by carefully checking all connections to make sure they are soldered as described in the "Soldering" section of the "Kit Builders Guide."

3. Check the values of the parts. Be sure that the proper parts have been wired into each circuit. It would be quite easy, for example, to mistakenly install a 1000 Ω (brown-black-red) resistor where a 10 kΩ (brown-black-orange) resistor was called for.

4. Check electrolytic capacitors and diodes to be sure they are installed properly, with the marked end of each one positioned as it is shown in the Pictorial.

5. Check each transistor to be sure it is installed properly, with each lead going to the proper hole on the circuit board.

6. Check for bits of solder, wire ends or other foreign matter which may be lodged in the wiring, or for solder bridges between foils on the circuit board.

7. If, after careful checks, the trouble is still not located and a voltmeter is available, check voltage readings against those shown on Voltage Chart (Page 43) and Schematic (fold-out from Page 55).

   NOTE: All voltage readings were taken with a high impedance voltmeter. Voltages may vary as much as 20%.

8. Check transistors with a transistor tester or by substitution of transistors of the same types known to be good.

9. A review of the "Circuit Description" may also help you locate a difficulty.

NOTE: In an extreme case where you are unable to resolve a difficulty, refer to the "Customer Service" information inside the rear cover of the Manual. Your Warranty is located inside the front cover.

TROUBLESHOOTING

CAUTION: The full ac line voltage is present at the input wiring to the power transformer.

In using a voltmeter probe, or any other metal object in troubleshooting, be careful to touch only those points on the master amplifier circuit board which are specified in the Voltage Chart.

Disconnect all remote wires from the master terminal board screws before troubleshooting the Master.

Troubleshooting Chart

PROBLEM	POSSIBLE CAUSE
Unit completely inoperative.	1. Incorrect ac wiring to or from power transformer. 2. Diodes D2 or D3 (#57-65) installed backward or faulty. 3. Transistor (Q1 – Q8) improperly installed or faulty. 4. Talk switch or Station Selector switch wired incorrectly. 5. Terminal board wired incorrectly. 6. Volume control (R13) wired incorrectly. 7. Volume control mounted backward. 8. Speaker wired incorrectly or defective.
Weak or distorted sound.	1. Transistor (Q1 – Q8) improperly installed or faulty. 2. Diode D1 (#56-61) installed backward. 3. Electrolytic capacitor (C7, C12, C13, C16, C17) installed backward. 4. Wrong value of resistor installed on circuit board. 5. Solder bridges between circuit board foils. Check both the switch and amplifier circuit boards. 6. Defective speaker.
Units operate after Assembly and Initial Test, but then have hum in the sound or do not operate when installed at the location where they are used.	1. Defective wiring between stations. 2. Jumper wires not installed or not making electrical connection at wire socket. 3. Terminal board wiring incorrect. 4. Switch circuit board wiring incorrect. 5. In some cases hum may be caused by the ac source. Reverse the ac plug at each Master Station to eliminate this type of hum.
No sound between two Master Stations.	1. Resistors (15 kΩ) on terminal board incorrectly wired, open, or have poor solder joints.

VOLTAGE CHART

(Circuit Board Shown From Component Side)

SPECIFICATIONS

Power Output	
With 7.5 Ω Load*	2 W at 10% THD (total harmonic distortion).
With 45 Ω Load**	500 mW at 2% THD.
Sensitivity	
In All Call Mode	2 mV with a 7.5 Ω load at 1.5 W.
Talking to One Remote	2 mV with a 45 Ω load at 300 mW.
Hum and Noise	50 dB below 1.5 W level (7.5 Ω load, no input signal).
Common Mode Rejection	26 dB below normal input (7.5 Ω load).
Power Requirements	2 W output: 120/240 Vac, 50/60 Hz, 7 W maximum.
	Standby (no output): 120/240 Vac, 50/60 Hz, 2 W.
System Connections	Designed for use with Heathkit Models: GD-120 Indoor Remote Station, GD-130 Outdoor Remote Station, other GD-110 Master Stations.
Operating Functions	Selective call, all call, dictate, conference calls between Masters, simultaneous conversations, private remotes, non-private remotes.
Amplifier Circuit	Differential inputs with class AB final amplifier.
Maximum Wire Length Between Units	1000 feet (using Heath Intercom cable).
Cabinet Size	4-1/2" high x 8-1/2" wide x 7" deep.
Net Weight	3 lbs.

*Six remote stations.
**One remote station.

The Heath Company reserves the right to discontinue products and to change specifications at any time without incurring any obligation to incorporate new features in products previously sold.

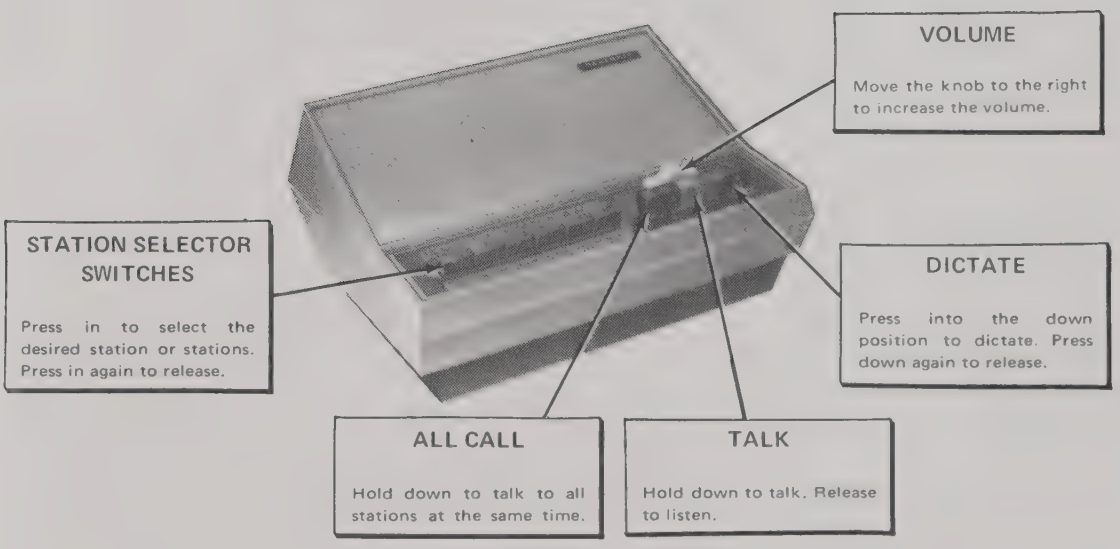
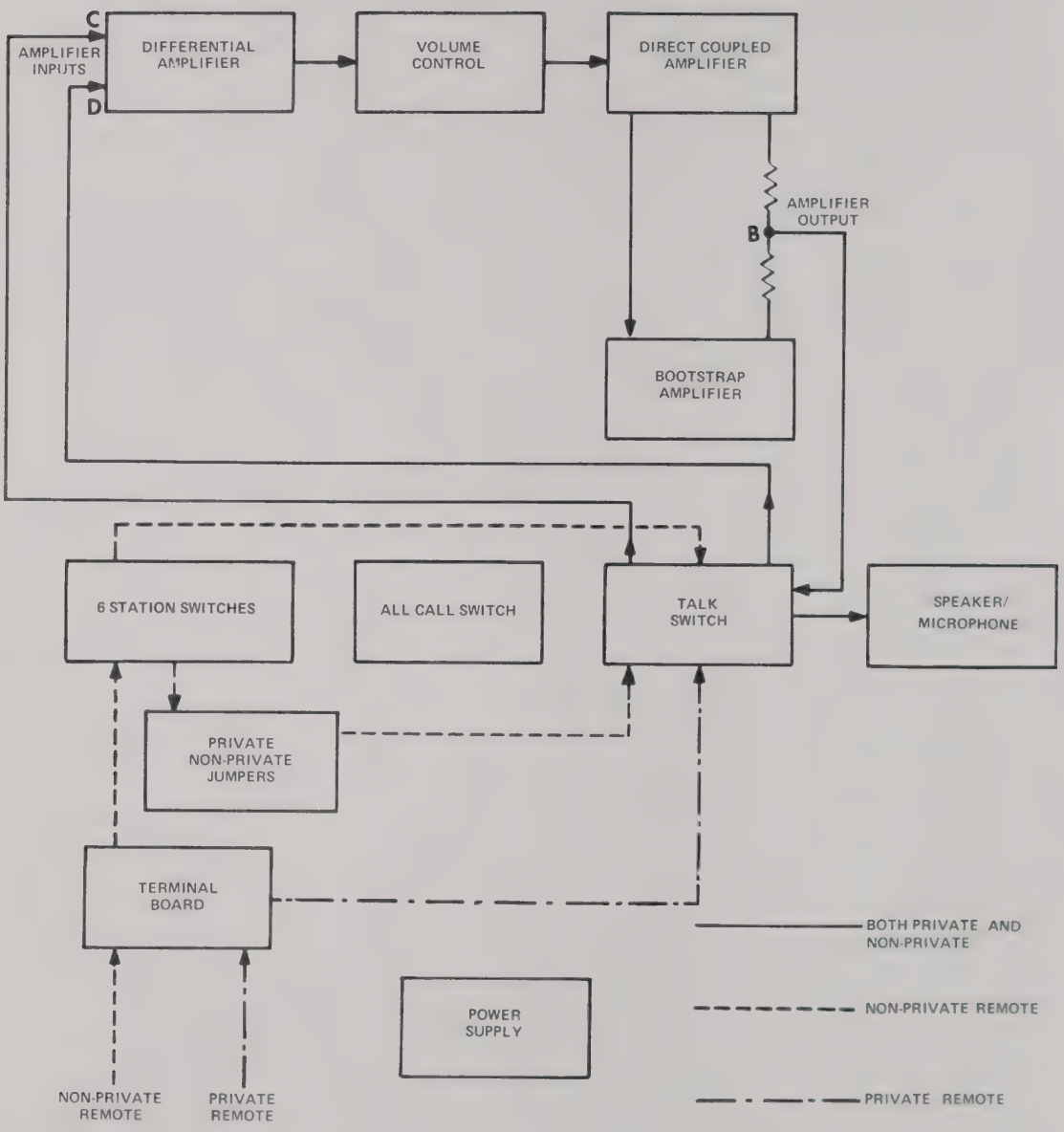
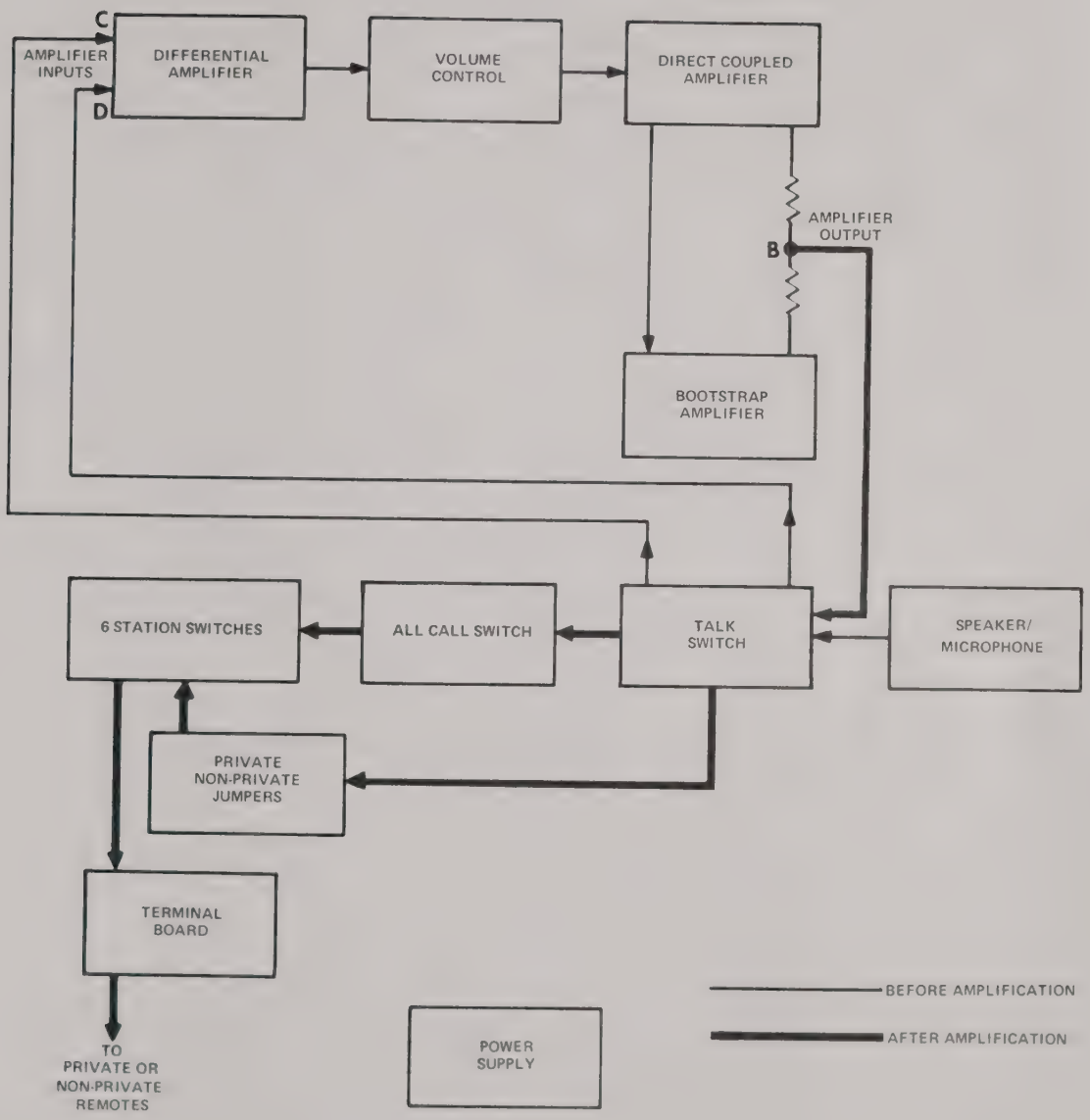

VOLUME
Move the knob to the right to increase the volume.
STATION SELECTOR SWITCHES
Press in to select the desired station or stations. Press in again to release.
DICTATE
Press into the down position to dictate. Press down again to release.
ALL CALL
Hold down to talk to all stations at the same time.
TALK
Hold down to talk. Release to listen.

Figure 15
(Repeat)

MASTER LISTENS
BLOCK DIAGRAM



MASTER TALKS
BLOCK DIAGRAM



CIRCUIT DESCRIPTION

This Circuit Description has two principal parts: "Intercom System Signal Flow," and "Amplifier." The first part traces the signal flow through the switching in the Master. The second part describes the amplifier circuit. Refer to the proper Schematic as you read each part.

INTERCOM SYSTEM SIGNAL FLOW

SIGNALS FROM MASTER

Refer to the "Master-Talks Block Diagram" (fold-out from Page 46) and the Schematic (fold-out from Page 55) as you read the following descriptions.

To Private Remote Stations and Masters

The input signal originates in the Master station at the speaker, which is used as a microphone in this mode of operation. From the speaker, the signal is applied to the differential amplifier inputs through Talk switch lugs 14-15-9-8 and 17-18-24-23.

From the amplifier output, the signal is coupled through the Talk switch at lugs 12, 11, 5, and 6 to the private bus; and from here through lugs 3 and 2 of Station Selector switch #5 (used here as an example) to lug F5 on the terminal board. The signal is then applied from F5 and one of the ground lugs at D to the switch and speaker of the remote station.

To Non-Private Remote Stations at #1 Through #4

The input signal from the speaker is applied to the inputs of the amplifier through the Talk switch lugs 14-15-9-8 and 17-18-24-23. From the output of the amplifier the signal is coupled through the Talk switch at lugs 21 and 20 to the non-private bus. From here it is coupled through the jumper and lugs 3 and 2 of the Station Selector switch to lug F2 (used here as an example) on the terminal board. The signal from F2 and E2 is applied to the speaker of the remote station. Lug E2 is grounded, as before, through lugs 5 and 6 of the Station Selector switch and lugs 2 and 3 of the Talk switch.

INPUT SIGNALS TO MASTER

Refer to the "Master-Listens Block Diagram" (fold-out from Page 46) as you read the following descriptions.

From All Remotes With "Call In"

The Input signals from all remote stations with "call in" are coupled from the B and C lugs on the terminal board through Talk switch lugs 22, 23, 7, and 8 to the inputs of the differential amplifier. The output signals from the amplifier are coupled through Talk switch lugs 16 and 17 to the speaker, which is grounded through lugs 14 and 13.

From Non-Private Remotes (Selected by Master Station)

Non-private stations can be connected at Station Selector positions 1 through 4. For this type of operation, the jumper wires are connected from lug 3 of the Selector switch to the non-private bus.

With the proper Station Selector switch depressed at the Master Station, the input signal from the non-private station is applied to lugs F2 and E2 (used here as an example) on the Master terminal board. Lug E2 is connected to the amplifier input through lugs 5 and 6 of the Station Selector switch and lugs 2, 1, 7, and 8 of the Talk switch. Lug F2 is connected to the input of the amplifier through lugs 2 and 3 of the Station Selector switch, the jumper wire, the non-private bus, and lugs 20, 19, 22, and 23 of the Talk switch.

From Another Master

An input signal from Another Master is coupled from lug A1 (used here as an example) to the amplifier through resistor R36 and lugs 7 and 8 of the Talk switch. The other side of the signal path is from terminal D on the terminal board to the ground side of R1 or R2.

ALL-CALL FUNCTION

In this mode of operation, the output signal from the amplifier is coupled through Talk switch lugs 12, 11, 6, and 5 to the All-Call switch. The signal from this switch is coupled through lugs 1 and 2 of Station Selector switch #1 (used here as an example) to lug F2 on the terminal board. An output signal thus appears in each F lug on the terminal board in the same manner. Each return line on stations 1 through 4 is grounded through lugs 5 and 4 of the Station Selector switch if the stations are non-private. All other stations are grounded through one of the D lugs on the terminal board.

AMPLIFIER

Refer to the "Master-Listens Block Diagram" and the Schematic (fold-out from Page 55) as you read the following paragraphs.

Input signals to the amplifier are coupled to input differential amplifier stage Q1 — Q2 through a resistor-capacitor network composed of R1, R5, R2, and R3, and C1 through C5. The network also filters out any high frequencies that are picked up by long intercom wiring. Q1 and Q2 amplify the incoming signal and, through common mode rejection, remove any other interference. R6 through R12 set the proper bias voltages and currents for this stage.

From the collector of Q2, the signal is coupled through C6 to the ungrounded end of Volume control R13. The signal leaves the Volume control at the slider terminal and is coupled through C8 and R15 to the base of amplifier stage Q3. Capacitors C9 and C10 bypass any remaining unwanted frequencies to ground.

The signal at the collector of Q3 is direct-coupled to the base of Q4, where it is further amplified. From the collector of Q4, the signal goes to Q5 and Q7.

From Q4, the signal is coupled directly to the base of Q5, and through R21 and double diode D1 to Q7. The constant voltage drop across R21 and these diodes sets the bias voltage for the driver and output stages. Capacitor C13 and resistors R22 and R23 couple a portion of the output signal back to bootstrap transistor Q5 to reduce distortion. Driver transistors Q5 and Q7 and output transistors Q6 and Q8 form a quasi-complementary output circuit. In this circuit, a positive-going signal at the base of Q5 causes this transistor to conduct. This in turn causes Q6 to conduct, which causes a current to flow through R25, C16, L1, and the voice coil of the speaker connected to the output. Negative-going signals cause Q7 and Q8 to conduct, reversing the current through R26, C16, L1, and the speaker voice coil. This alternate increase and decrease of current in the speaker voice coil converts the electrical signal back to sound.

R27 and C18 suppress the parasitic oscillations that would otherwise occur at the output due to the input and output signals being in phase.

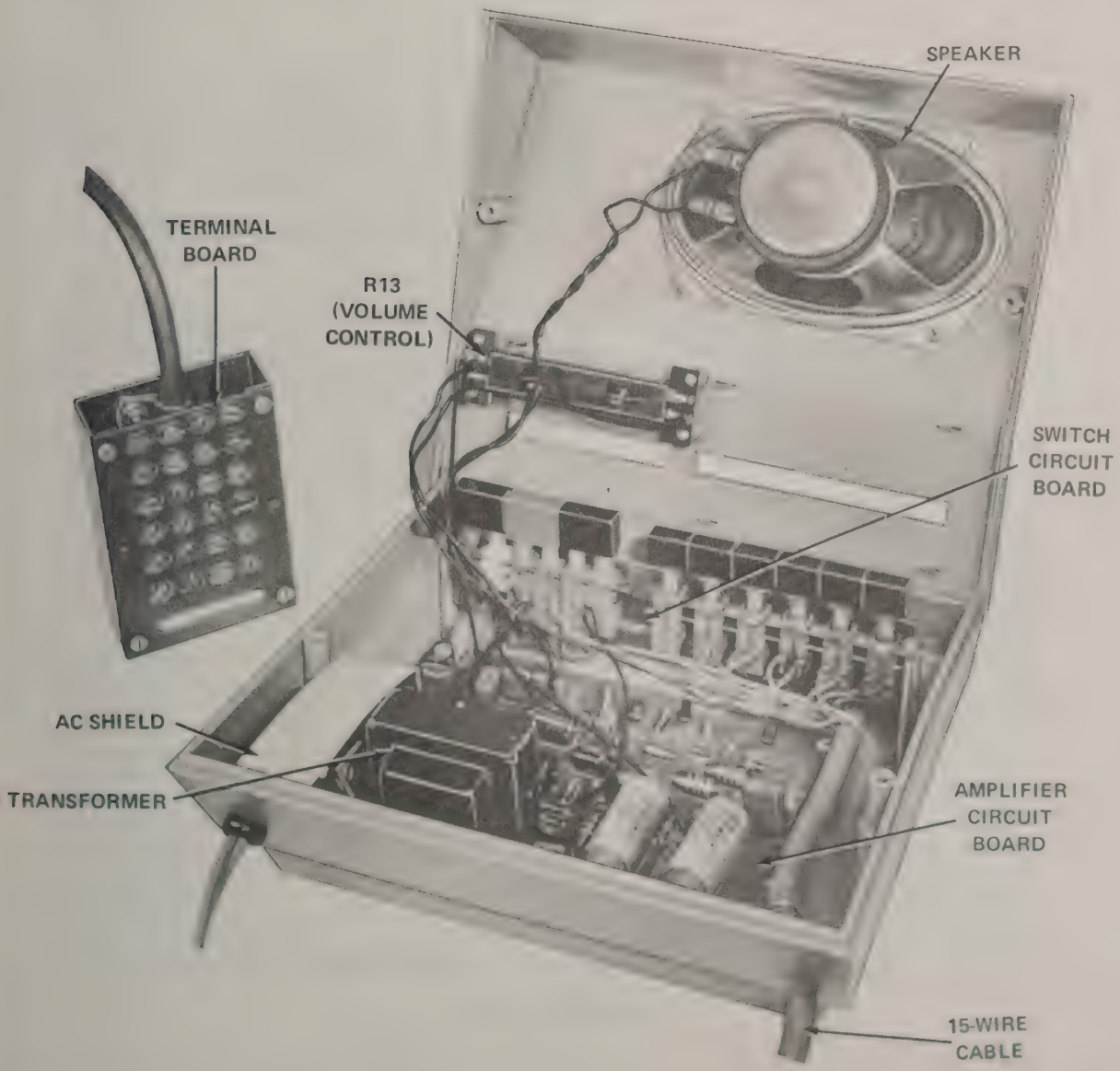
R20 and R18 are connected in a voltage divider that applies the proper amount of feedback to the emitter of Q3 to stabilize amplifier operation and reduce distortion. C12 and R19 determine the gain of the amplifier.

Audio filter choke L1 is connected in series with the output to prevent oscillations from occurring due to the stray capacity across the long intercom output leads.

POWER SUPPLY

AC power from the line cord is connected to the primary windings of power transformer T1. The secondary winding of the power transformer is connected to a full-wave rectifier circuit that includes diodes D2 and D3. The dc output from these rectifiers is filtered by filter capacitor C17.

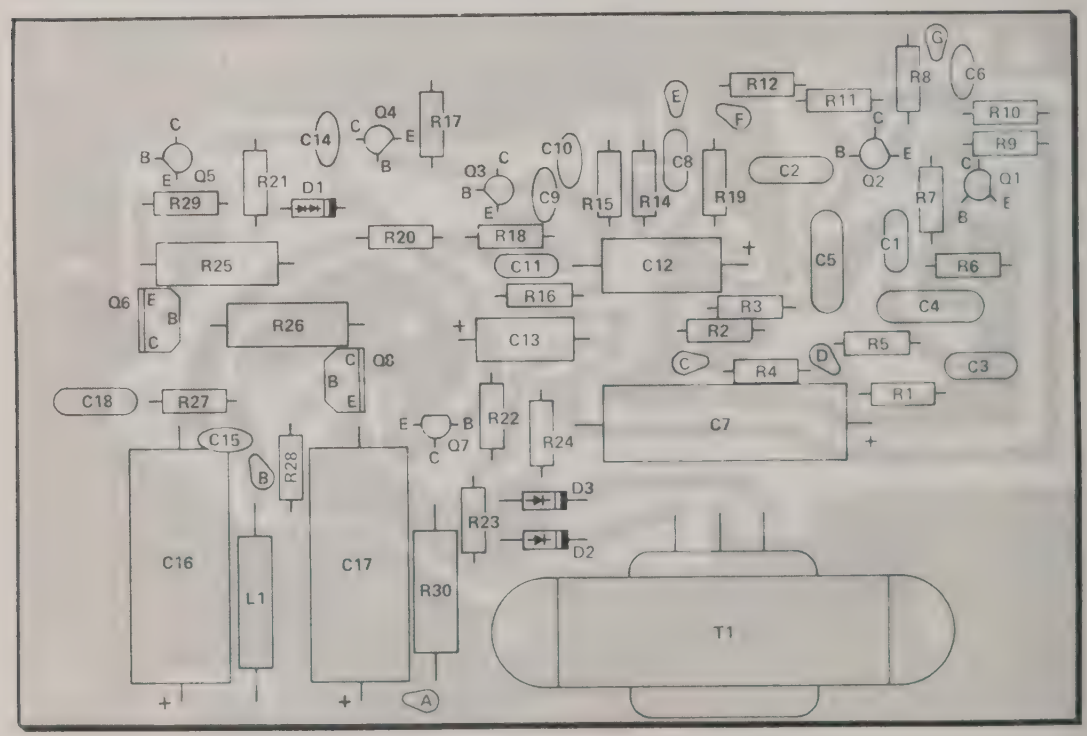
IDENTIFICATION PHOTOGRAPH



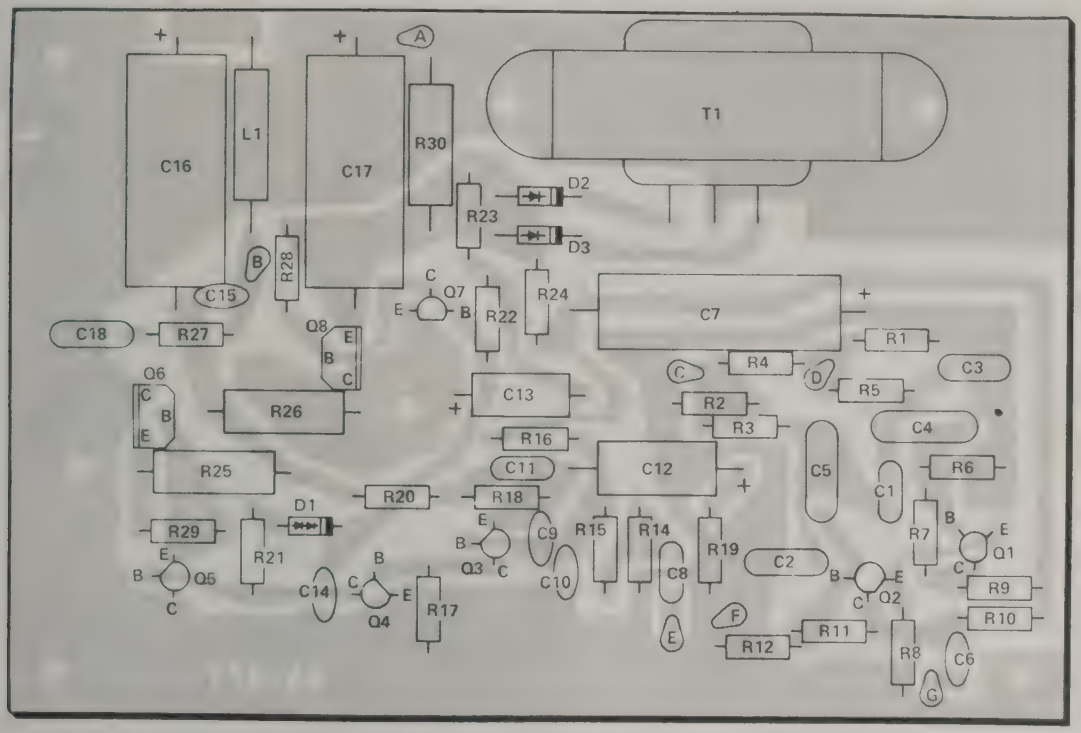
CIRCUIT BOARD X-RAY VIEWS

NOTE: To identify a part shown in one of these Views, so you can order a replacement, proceed as follows:

1. Note the identification number of the part (R-number, C-number, etc.).
2. Locate the same identification number (next to the part) on the Schematic. The "Description" of the part (for example: 220 kΩ, .047 μF, or 2N3393) will also appear near the part.
3. Look up this Description in the Parts List.

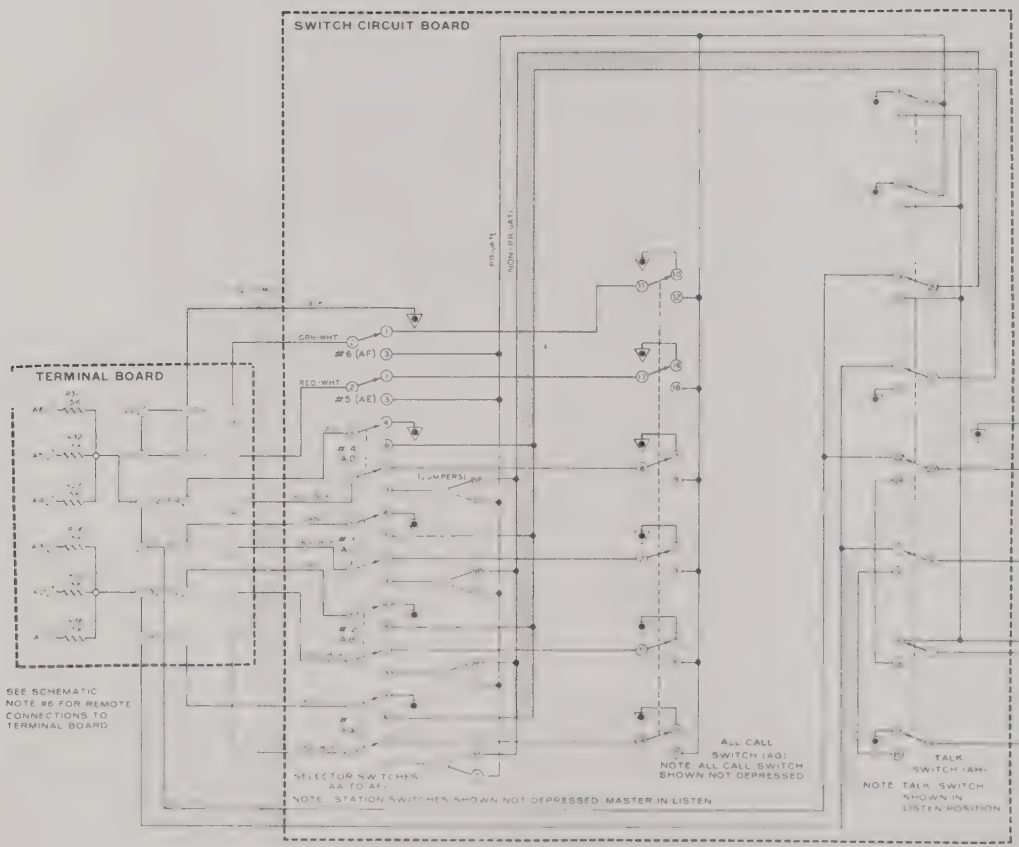


(Shown from foil side)



(SHOWN FROM COMPONENT SIDE)

COMPONENT	HEATH PART NUMBER	MAY BE REPLACED WITH	BASE DIAGRAM (BOTTOM VIEW)
Q1, Q2	417-153	2N4248	EMITTER, BASE, COLLECTOR
Q3	417-91	2N3391	BASE, COLLECTOR, EMITTER
Q4, Q7	417-201	X29A829	BASE, COLLECTOR, EMITTER
[illegible]	[illegible]	[illegible]	BASE, COLLECTOR, EMITTER
[illegible]	[illegible]	MPSU05	COLLECTOR, BASE, EMITTER
[illegible]	[illegible]	[illegible]	BANDED END
D2, D3	57-65	1N4002	BANDED END



SCHEMATIC OF THE
HEATHKIT
MASTER INTERCOM STATION
MODEL GD-110

NOTES

1. ALL RESISTO
IN OHMS (K=
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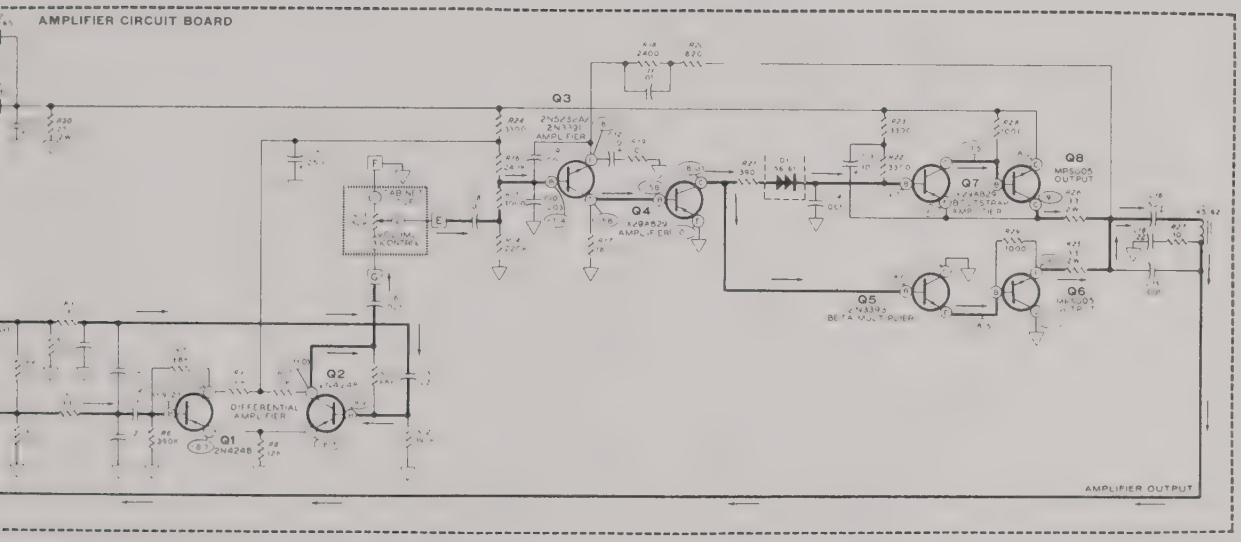

ARE 1/2 WATT UNLESS OTHERWISE MARKED. RESISTOR VALUES ARE
01)

VALUES ARE IN μF.

OL INDICATES A CONNECTION TO THE AMPLIFIER CIRCUIT BOARD.

OL INDICATES A NEGATIVE DC VOLTAGE MEASURED FROM THE POINT
TO B+ GROUND (ON LARGE FOIL ON AMPLIFIER CIRCUIT BOARD
RANSFORMER). THE VOLTAGES WERE MEASURED WITH A HIGH
TMETER. SUPPLY VOLTAGE OF 120 VAC. VOLUME CONTROL FULLY
NO SIGNAL INPUT TO AMPLIFIER, AND MASTER NOT CONNECTED TO

OL INDICATES FOIL GROUND ON THE AMPLIFIER CIRCUIT BOARD.

OL INDICATES FOIL GROUND ON THE SWITCH CIRCUIT BOARD.

6. TERMINAL BOARD CONNECTIONS FROM REMOTE STATIONS ARE AS FOLLOWS

WIRES CONNECTED TO:	FURNISH:
A	INPUT SIGNALS TO THE MASTER FROM OTHER MASTERS
B AND C	INPUT SIGNALS TO THE MASTER FROM REMOTES WITH CALL-IN
D	GROUND FOR SIGNALS GOING TO OR FROM A OR F TERMINALS
E AND F	NON-PRIVATE REMOTE INPUT AND OUTPUT SIGNALS
F	ALSO FURNISHES OUTPUT SIGNALS TO OTHER MASTERS AND PRIVATE REMOTES.

7. ⟶ THESE ARROWS INDICATE THE SIGNAL PATH

EXPEDITED PARTS ORDER FORM

(FOR REPAIR PARTS ONLY)

PLEASE DO NOT WRITE IN THIS SPACE

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

SEND TO: **HEATH COMPANY**
BENTON HARBOR,
MICHIGAN 49022
ATTN PARTS REPLACEMENT

KIT MODEL	PURCHASE DATE	INVOICE NUMBER	LOCATION PURCHASED

QTY.	HEATH PART NUMBER	DESCRIPTION OF PART	PRICE	TOTAL PRICE	DESIRED METHOD OF SHIPMENT
					EDITORS INITIALS

INSTRUCTIONS:

- INCLUDE CHECK OR MONEY ORDER FOR TOTAL PARTS ORDERED ADD 10% (MINIMUM $0.25) FOR INSURANCE, POSTAGE AND HANDLING.
- AUTHORIZE PERMISSION FOR C.O.D. SHIPMENT (MINIMUM ORDER SHIPPED C.O.D. IS $10.00).
- MICHIGAN RESIDENTS ADD 4% SALES TAX

C.O.D. AUTHORIZATION

_____
SIGNED

THIS FORM IS FOR U.S. CUSTOMERS ONLY. OVERSEAS CUSTOMERS SEE YOUR DISTRIBUTOR.

CUT ALONG DOTTED LINE

EXPEDITED PARTS ORDER FORM

(FOR REPAIR PARTS ONLY)

PLEASE DO NOT WRITE IN THIS SPACE

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

SEND TO: **HEATH COMPANY**
BENTON HARBOR,
MICHIGAN 49022
ATTN PARTS REPLACEMENT

KIT MODEL	PURCHASE DATE	INVOICE NUMBER	LOCATION PURCHASED

QTY.	HEATH PART NUMBER	DESCRIPTION OF PART	PRICE	TOTAL PRICE	DESIRED METHOD OF SHIPMENT
					EDITORS INITIALS

INSTRUCTIONS:

- INCLUDE CHECK OR MONEY ORDER FOR TOTAL PARTS ORDERED ADD 10% (MINIMUM $0.25) FOR INSURANCE, POSTAGE AND HANDLING.
- AUTHORIZE PERMISSION FOR C.O.D. SHIPMENT (MINIMUM ORDER SHIPPED C.O.D. IS $10.00).
- MICHIGAN RESIDENTS ADD 4% SALES TAX

C.O.D. AUTHORIZATION

_____
SIGNED

THIS FORM IS FOR U.S. CUSTOMERS ONLY. OVERSEAS CUSTOMERS SEE YOUR DISTRIBUTOR.

CUSTOMER SERVICE

REPLACEMENT PARTS

If you need a replacement part, please fill in the Parts Order Form that is furnished and mail it to the Heath Company. Or, if you write a letter, include the:

- **Part number** and **description** as shown in the **Parts List.**
- Model number and Series number from the blue and white label.
- Date of purchase.
- Nature of the defect.

Please do not return parts to the factory unless they are requested. Parts that are damaged through carelessness or misuse by the kit builder will not be replaced without cost, and will not be considered in warranty.

Parts are also available at the Heathkit Electronic Centers listed in your catalog. Be sure to provide the Heath part number. Bring in the original part when you request a warranty replacement from a Heathkit Electronic Center.

NOTE: Replacement parts are maintained specifically to repair Heathkit products. Parts sales for other reasons will be declined.

TECHNICAL CONSULTATION

Need help with your kit?.... Self-Service?.... Construction?.... Operation?.... Call or write for assistance. You'll find our Technical Consultants eager to help with just about any technical problem except "customizing" for unique applications.

The effectiveness of our consultation service depends on the information you furnish. Be sure to tell us:

- The Model number and Series number from the blue and white label.
- The date of purchase.
- An exact description of the difficulty.
- Everything you have done in attempting to correct the problem.

Also include switch positions, connections to other units, operating procedures, voltage readings, and any other information you think might be helpful.

Please do not send parts for testing, unless this is specifically requested by our Consultants.

Hints: Telephone traffic is lightest at midweek. . .please be sure your Manual and notes are on hand when you call.

Heathkit Electronic Center facilities are also available for telephone or "walk-in" personal assistance.

REPAIR SERVICE

Service facilities are available, if they are needed, to repair your completed kit. (Kits that have been modified, soldered with paste flux or acid core solder, cannot be accepted for repair.)

If it is convenient, personally deliver your kit to a Heathkit Electronic Center. For warranty parts replacement, supply a copy of the invoice or sales slip.

If you prefer to ship your kit to the factory, attach a letter containing the following information directly to the unit:

- Your name and address.
- Date of purchase.
- Copies of all correspondence relevant to the service of the kit.
- A brief description of the difficulty.
- Authorization to return your kit C.O.D. for the service and shipping charges. (This will reduce the possibility of delay.)

Check the equipment to see that all screws and parts are secured. (Do not include any wooden cabinets or color television picture tubes, as these are easily damaged in shipment.) Place the equipment in a strong carton with at least THREE INCHES of *resilient* packing material (shredded paper, excelsior, etc.) on all sides. Use additional packing material where there are protrusions (control sticks, large knobs, etc.). If the unit weighs over 15 lbs., place this carton in another one with 3/4" of packing material between the two.

Seal the carton with reinforced gummed tape, tie it with a strong cord, and mark it "Fragile" on at least two sides. Remember, the carrier will not accept liability for shipping damage if the unit is insufficiently packed. Ship by prepaid express, United Parcel Service, or insured Parcel Post to:

Heath Company
Service Department
Benton Harbor, Michigan 49022

HEATH

Schlumberger

MP MASTER

MA22770

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